

THE UNIVERSITY OF TEXAS AT AUSTIN

RECOMMENDATION FOR CHANGE IN ACADEMIC RANK/STATUS

Name: Heidari, Zoya EID: zh732 Present Rank: Assistant Professor

Years of Academic Service (Include AY 2017-18 in each count):

At UT Austin since: 9/1/2015 (month/day/year) Total Years at UT Austin: 3In Present Rank since: 9/1/2015 (month/day/year) Total Years in Present Rank: 3

Tenure-track only:

Number of Years in Probationary Status: 3Additional information: AcceleratedPrimary Department: Petroleum and Geosystems EngineeringCollege/School: Engineering, Cockrell School ofJoint Department: N/ACollege/School: N/AOther Department(s): N/ARecommendation actions¹:By Budget Council/Executive Committee: PromoteVote² for promotion 2; Against 0; Abstain 1; Absent 0; Ineligible to vote 1By Department Chair: PromoteBy College/School Advisory Committee: PromoteVote² for promotion 7; Against 0; Abstain 0; Absent 0; Ineligible to vote 0By Dean: PromoteAdministrative Action: Promote to Associate ProfessorDate Action Effective: September 1, 2018

(To be submitted to the Board of Regents as part of the annual budget.)

By: Maurice M. Linn Date: February 15, 2018

For the President

¹ See "Chart of Recommended Actions" for eligible recommended actions applicable to specific conditions and administrative levels.² Record all votes for and against promotion, abstentions by eligible voting members, and the number of absent eligible voting members. The number of committee members ineligible to vote should also be recorded. Enter zero where it would otherwise be blank.

EVPP/4.15





The University of Texas at Austin

Cockrell School of Engineering

Dean's Assessment**Zoya Heidari**

Hildebrand Department of Petroleum and Geosystems Engineering
Cockrell School of Engineering

Dr. Zoya Heidari received her BSc in mechanical engineering and MSc in biomechanical engineering from Sharif University of Technology (Iran) in 2005 and 2007, respectively. She received her PhD in petroleum and geosystems engineering from the University of Texas at Austin in 2011¹. She joined the faculty in the Harold Vance Department of Petroleum Engineering at Texas A&M University as an assistant professor in September 2011, and moved to the Hildebrand Department of Petroleum and Geosystems Engineering (PGE) at the University of Texas at Austin in September 2015.

If promoted to associate professor in September 2018, Dr. Heidari will have accumulated three years of probationary service at UT and a total of seven years in rank as an assistant professor. While this case is considered to be accelerated when considering only Dr. Heidari's time at UT, her total time in rank exceeds our normal timeline.

Dr. Heidari's research is focused on the in-situ formation evaluation and petrophysical assessment of permeable rocks with a goal of quantifying the fluid storage and transport properties. Dr. Heidari has also developed several new methods and algorithms for the quantification of effective physical properties of rocks and she has advanced new procedures for the enhanced in-situ assessment of rock properties using a variety of fluid/solid contrast agents, including nanoparticles. Within the Hildebrand Department of Petroleum and Geosystems Engineering, her work contributes to three of the twelve primary research areas: formation evaluation; unconventional resources; and petrophysics and pore-scale processes.

Eight external letters were submitted as part of the promotion dossier, with three letter writers recommended by Dr. Heidari and five selected by the budget council. Seven letter writers are faculty at US institutions: Colorado School of Mines, Houston², Oklahoma, Penn State³, Stanford, and Texas A&M⁴. One letter writer is a faculty member at Imperial College London. Two of the letter writers are members of the National Academy of Engineering (NAE).

Letters were solicited from three additional external reviewers. Two declined due to personal commitments and/or lack of familiarity with Dr. Heidari's area of research. One potential reviewer did not respond to the request.

¹ Carlos Torres-Verdin supervised Dr. Heidari during her graduate studies at UT.

² Christine Ehlig-Economides served as Dr. Heidari's faculty mentor at Texas A&M for three years before she joined the University of Houston in 2014. However, there is no record of any formal research collaboration.

³ Russell Johns served on the faculty in the Department of Petroleum and Geosystems Engineering at UT Austin from 1995 to 2010. Dr. Heidari did not take any courses from Dr. Johns, and he did not serve on her PhD committee.

⁴ Michael King served as the chair of the search committee when Dr. Heidari was hired at Texas A&M. There is no record of any formal research collaboration.

Teaching

While in rank at UT, Dr. Heidari has taught one undergraduate course and two graduate courses:

- PGE 337, *Introduction to Geostatistics*
Required undergraduate course
Taught two times (average enrollment of 56 students)
Instructor ratings: 4.0 to 4.4 | Course ratings: 3.7 to 4.0
- PGE 383, *Rock Physics*
Graduate elective
Taught once (7 students)
Instructor rating: 4.9 | Course rating: 4.6
- PGE 385K, *Advanced Multi-Well Formation Evaluation*
Graduate elective
Taught once (15 students)
Instructor rating: 4.4 | Course rating: 4.1

Dr. Heidari's average instructor at the undergraduate level are slightly below the median (4.3) for both the department and the Cockrell School, and her average instructor rating at the graduate level is above the median within the department (4.3) and school (4.5). Senior faculty conducted peer evaluations in Dr. Heidari's courses two times in rank. Carlos Torres-Verdin provided very specific feedback regarding areas of potential improvement in her undergraduate course. Student comments were generally positive, but several complained about using MatLab in PGE 337.

Dr. Heidari taught eight courses as a faculty member at Texas A&M. Her average instructor rating was 3.95/5.0 in the undergraduate courses and 4.43/5.0 in the graduate courses.

Research

Dr. Heidari's research focuses on petrophysics and multi-scale formation evaluation, especially for unconventional resources (carbonates and shale formations). Her key contributions involve the use of nuclear magnetic resonance (NMR) measurements for detection of production zones, developing new models for formation evaluation, and describing the rock fabric (spatial pore geometry) in reservoirs. Highlights of Dr. Heidari's research accomplishments include:

- 30 archival journal publications in rank⁵ (34 career total). She published 23 journal papers in rank with her graduate students.
- Many of her publications are in top journals in her field including *Applied Clay Science* (IF=3.1), *AAPG⁶ Bulletin* (2.8), *Geophysics* (2.4), *SPE⁷ Journal* (2.2), and *Mathematical Geosciences* (2.0). She has also published extensively in journals that are more narrowly focused on her specific research interests: *Journal of Petroleum Science and Engineering* (1.9), *SPE Reservoir Evaluation & Engineering* (1.7), *SPE Production & Operations* (0.8), *Petrophysics* (0.8), and *Interpretation – A Journal of Subsurface Characterization* (0.7).
- An h-index of 11 (Google Scholar) with 372 citations.

⁵ 17 at UT (four are in press) and 13 at Texas A&M

⁶ American Association of Petroleum Geologists

⁷ Society of Petroleum Engineering

While at Texas A&M, Dr. Heidari established an impressive record of research funding from industry and foundations:

- She established a joint industry research program (JIP) with six members, which provided \$900,000 (all her share)
- She received \$100,000 from the American Chemical Society Petroleum Research Fund through the Doctoral New Investigator grant program.
- She received \$40,000 from the Society of Petroleum Engineers through a Research Fellowship Award for new faculty.
- She and several colleagues worked directly with industrial sponsors to secure \$930,000 (\$525,000 her share).
- She secured two research projects from JIP directed by senior faculty at Texas A&M (\$300,000 her share).
- She was a co-PI on a grant with colleagues at Texas A&M Qatar from the Qatar National Research Foundation for \$900,000 (\$110,000 her share).
- She was a co-PI on a multi-university team that secured \$3.9 million from the Skoltech Center for Research (Russia) (\$540,000 her share).
- She received four grants through the Crisman Institute⁸ at Texas A&M, for a total of \$770,000 (\$700,000 her share).

Her share of research funding at Texas A&M exceeded \$3.4 million, which is a remarkable amount. However, the level of peer-review for these grants is not clear. Since joining UT, Dr. Heidari has received one external research grant from the Texas Oil and Gas Institute of the University of Texas System, and she established an industrial affiliate research program (IAP) with one member⁹. She is the sole PI on these grants/projects. Her total funding at UT Austin is \$200,000 (all her share).

The global decrease in oil prices has reduced Dr. Heidari's ability to secure research funding from industry at UT, but she had several additional contracts pending at the time that her promotion dossier was submitted.

All the external reviewers discussed the quality and impact of Dr. Heidari's work and recommended promotion. Martin Blunt¹⁰ (Imperial College London) offered a recommendation, "My only advice would be for her to consider aiming to publish some work in higher-profile or more general journals with a broader readership: at present most papers are published in somewhat specialist petroleum publications."

Advising and Student Mentoring

At Texas A&M, Dr. Heidari graduated five PhD (one co-supervised) and eight MS students (three co-supervised). Dr. Heidari is currently advising five PhD and three MS students (one co-supervised) at UT and she continues to co-supervise a PhD student at Texas A&M. She also mentored one postdoctoral fellow at UT.

⁸ Funding is provided through an endowment and annual support from member companies.

⁹ She is currently negotiating with three additional industry members. Each member company will provide \$50,000 annually to the IAP.

¹⁰ Department of Earth Science and Engineering

University Service

Dr. Heidari's university service has been focused at the department level at UT, where she has served on a faculty recruiting committee and the graduate admissions committee. She is also a member of the Women in Engineering Program advisory committee for the Cockrell School.

Professional Service

Dr. Heidari is a member of several professional organizations. She currently serves as an associate editor for *SPE Production & Operations* and *Mathematical Geosciences* (Springer). She was recently elected to a two-year term as vice president of education for the Society of Petrophysicists and Well-Log Analysts.

Other Evidence of Merit or Recognition

Dr. Heidari's accomplishments have been recognized by the Society of Petroleum Engineers:

- She received a Research Fellowship Award in 2012 (six awarded). The award provides seed funding to new faculty members and recognizes their creative research ideas.
- She received an Innovative Teaching Award in 2015 (five awarded).
- She received the Cedric K. Ferguson Medal in 2017 for the best paper published in an SPE journal by an SPE member who is younger than 36.

Overall Assessment

In summary, Dr. Heidari is a dedicated teacher and an outstanding researcher. She established an extremely well-funded research program at Texas A&M from a variety of industry sources, and is working diligently to reestablish her research program at UT. External referees enthusiastically support her promotion. Her record of student advising and mentoring is strong. She is quite active in the professional community and she has received several competitive awards from the Society of Petroleum Engineers.

To date, Dr. Heidari has not received any federal research funding, but this is not a requirement for promotion. Many of the faculty in the Hildebrand Department of Petroleum and Geosystems Engineering receive the majority of their research funding from industry.

One may ask why Dr. Heidari is being considered for promotion at this time, when she has not yet reestablished her research program at UT. A commitment was made when she was recruited from Texas A&M that her promotion case would be considered in a timely manner. The department budget council and I do not believe that the global downturn in oil and gas prices should be the deciding factor in the duration of her probationary period at UT. As such, I believe that Dr. Heidari's performance meets or exceeds expectations for early promotion to associate professor with tenure in all categories, and I support this case without reservation.



Sharon L. Wood, Dean
20 November 2017

Chair's Statement
Zoya Heidari, Petroleum and Geosystems Engineering
Promotion from Assistant to Associate Professor with Tenure

Summary Statement

I fully support the Budget Council's decision to promote Dr. Zoya Heidari from Assistant Professor to Associate Professor with tenure. She has met or exceeded expectations in teaching, research and service to the Department of Petroleum and Geosystems Engineering (PGE), to the Cockrell School of Engineering, to The University of Texas at Austin, and to the broader scientific and professional community.

Dr. Heidari received her PhD in petroleum engineering from The University of Texas at Austin in August 2011. She worked for 4 years as an assistant professor at Texas A&M University before moving to the PGE department at UT in the fall of 2015. Although she has just finished her second year as an assistant professor at UT, she will be completing her 6th year in rank as an assistant professor. It is Dr. Heidari's wish to go up for tenure at this time, and the department supports that timing.

Budget Council Discussion and Decision

The promotion process started with the solicitation in June of external letters. The candidate submitted her statements and supporting materials over the summer, and these were made available for Budget Council review the week prior to our September 5, 2017 meeting, along with the external referee letters and Budget Council statements. The Budget Council statements were prepared by the PGE Promotion and Tenure Committee, consisting of Dr. Kamy Sepehrnoori (chair), Dr. Mukul Sharma and Dr. Eric van Oort. Dr. Carlos Torres-Verdin was an ad hoc member of the committee recruited to help prepare the research statement.

The entire Budget Council attended the September 5 meeting, except for our newest member, Dr. Quoc Nguyen. He was promoted to full professor effective September 1, 2017, and had not participated in the Budget Council process in the spring and summer leading up to the promotion vote. As such, in discussions with me prior to the meeting, he expressed the feeling that he was not well informed on the background of the candidates or the process, and he chose to abstain from voting. Our past history of promotion votes was to have the Budget Council meet before the beginning of the new academic year, and that had been our intention this year, so we had not been keeping Dr. Nguyen in the loop of our work. However, due to scheduling constraints and the late reception of outside reference letters that delayed our Budget Council statement completion, the process bled into September 2017. Including Dr. Nguyen's abstention, the final vote of the Budget Council for promotion of Dr. Heidari was 9 in favor, no opposed and 1 abstain.

The Budget Council discussion concerning Dr. Heidari was very complimentary of her teaching and research accomplishments. With regard to research, it was stated that she had been very productive and that her work was of high quality. The Budget Council agreed that her recognition by the Society of Petroleum Engineers (SPE) in being awarded the Cedric K. Ferguson Medal, given to contributors under

the age of 36 for excellence in research and associated publications, was a significant accomplishment. Another highlight of the discussion was the comment that although her PhD work was entirely theoretical and numerical, she had established a substantial laboratory research program during her time at Texas A&M, and she had reestablished that lab capability here at UT. This laboratory component, to augment the theoretical and numerical, is seen as key to her success.

Research money was also discussed. Dr. Heidari's record shows that her financial success at Texas A&M was quite impressive, bringing in more than \$3 million as her share for projects in which she was PI or co-PI. Since coming to UT, her incoming funds have been modest (on the order of \$200,000 her share), but there is good reason for this. Moving from A&M was disruptive, and most of her accounts could not be moved. Also, the timing of her move coincided with the precipitous drop of oil prices (from over \$100/barrel to less than \$50), so it has been a challenging environment for everyone to raise new money. The Budget Council recognized these challenges, and felt that Dr. Heidari was making good progress toward increasing her research support, having numerous proposals out to industry, federal agencies, and other funding sources (on the order of \$2.3 million pending). The assessment was that her results at UT have been good considering the times, and her incredible success at Texas A&M shows that she is more than capable to bring in the required funds to have a robust research program.

The Budget Council was completely satisfied with Dr. Heidari with respect to teaching. In addition to teaching a graduate class related to her research specialty, in which she did very well, she taught PGE's undergraduate geostatistics course, a new topic for her and one in which students have struggled in the past. Comments were made that she had done an excellent job with the course, and that her Course Instructor Survey (CIS) scores were better than those for the previous teachers of the course. The discussion on teaching moved into praise for her achievements in student mentorship, exemplified by her graduate student's success in completing their degrees (she has supervised 5 PhD's to completion at A&M in rank) and securing employment. This mentorship was also noted as exemplary with regard to her outreach efforts to involve girls and women in engineering.

One final point of discussion on Dr. Heidari was the topic of "hiring our own". There was one faculty member who voiced this concern, stating discomfort with a program hiring its own PhD students onto the faculty, but there was no specific criticism of Dr. Heidari in the comment. Responses from other Budget Council members asserted the fact that she had succeeded in separating herself from the work of her advisor (Dr. Carlos Torres-Verdin), and that she had left Austin and made it on her own, as she was on her way to promotion at Texas A&M when we hired her. She also had moved well beyond her PhD work by establishing a significant laboratory research effort that brought new capabilities to UT PGE. One final comment with regard to hiring our own PhD's was that given the fact that we are the number 1 ranked program in petroleum engineering in the country, and that our only true peers are only Stanford and possibly A&M, the pool of petroleum engineering trained candidates for hiring is very limited. We do also hire candidates with related degrees, such as quantitative geoscience and chemical engineering, but we have a strong desire to hire petroleum engineers, and our PhD graduates make for a very appealing candidate pool. Our current mix of faculty origin is 4 UT PGE PhD's out of 20 tenured or tenure-track, with 2 of those UT degreed being full professors over the age of 60. The Budget Council is

comfortable that we do not have a problem with in-breeding and will not have the problem any time soon, as am I.

Chair's Analysis of Teaching

The typical teaching load for an assistant professor in PGE is 3 courses per year. New hires typically get some teaching relief, teaching only one course per semester (2 per year) for a year or two. Dr. Heidari was offered two years of reduced teaching (1 and 1) at the time of hiring, and that is what she taught.

As outlined in the Budget Council statement on teaching, Dr. Heidari's CIS ratings for the undergraduate course, PGE 337, Geostatistics, are an improvement on the previous three years of offerings of the course prior to her arrival. From fall 2014 through fall 2016, the range of ratings for other PGE professors teaching PGE 337 was 3.4 to 4.2 (mean = 3.84) for instructor, while Heidari received 4.0 and then 4.4 for her two offerings. The previous course ratings were 3.1 to 3.9 (mean = 3.58), while Heidari received 3.7 followed by 4.0. These undergraduate numbers show both better student reception for the course than had been received previously, as well as Heidari gaining improvement from one year to the next, both encouraging signs for her undergraduate teaching capability. For her two offerings of graduate courses at UT, Heidari received on average a 4.65 instructor rating and a 4.35 course rating, both better than average ratings compared to the department and college.

Below are some excerpts from Dr. Heidari's course evaluation comments. The comments were overwhelmingly positive, particularly for her second offering of the undergraduate PGE 337 in spring 2017. Major themes were that she cares about the students, was very accessible outside of class, was organized and provided meaningful and useful homework assignments. Numerous students called her out as the best professor in PGE. The most common negative comment was complaining about the use of Matlab in the course (but Matlab is the coding tool that students are taught in our sophomore programming course). There were a few that complained about course organization and ability to answer questions in class, but these were more than outweighed by positive comments on the same topics. Below are a few excerpts from her undergraduate teaching comments to demonstrate that she is making a positive difference in many students' education and experience at UT.

Undergrad (spring 2016 and spring 2017 for PGE 337 – each bullet is a different student)

- Dr. Heidari is the gold standard of what PGE faculty should be. ...I've never met someone as professional and dedicated to her job.
- ...one of the best professors I've had at pure teaching.
- favorite professor this semester!
- Best organization of any class I've taken at UT.
- Love this professor.
- I truly enjoyed this course and Dr. Heidari. She encouraged me to be a better student and I really liked the way she ran her class.
- I thought the class was well organized and efficient.
- Was always motivated/enthusiastic to teach...

- Professor Heidari seems to care about her students and their progress more than any other professor I've had in this department.
- Dr. Heidari is one of the best professors I've had at UT... The course is well structured and the homeworks were well-designed.
- Dr. Heidari is one of the best PGE professors...

Given the CIS ratings, student comments and the peer evaluations of Dr. Heidari's teaching, my assessment is that she exceeds expectations with regard to teaching.

Chair's Analysis of Research

In my assessment of Dr. Heidari's research achievements, I will include excerpts from her external referees. Dr. Heidari received 8 external letters, 6 of which were writers chosen by the PGE Budget Council and 2 were suggested by her. The respondents include NAE members, faculty from the best petroleum related programs in the world (Stanford University, Imperial College and Texas A&M), current and former department or program chairs, and faculty from other peer petroleum engineering programs (Colorado School of Mines, Penn State and Oklahoma). Two potential NAE referees declined because of lack of knowledge in the field (Kleinberg, Schlumberger) and lack of time (Reynolds, Tulsa). One international referee never responded (Vinegar, Ben Gurion University). I do not consider any of these three non-responders to indicate a negative view of Dr. Heidari's accomplishments.

Dr. Heidari published 30 journal papers over the past 6 years while in rank as an assistant professor (at the time we sent her packet out for review, the in rank number of journal papers was only 25, which you may notice in their comments). This number of 30 papers in rank as an assistant professor is significantly greater than the last five PGE faculty promoted to associate professor with tenure (see Table 1). This demonstrates that Dr. Heidari has been exceptionally productive in her research program, and most of those papers (23) were co-authored with students.

Table 1. Publications numbers when going up for promotion to associate professor					
	In-Rank	Total	Date Promoted	Date PhD granted	Years since PhD at promotion
Heidari	30	34	----	2011	6
Prodanovic	22	31	2016	2005	11
Foster	19	22	2017	2009	6
DiCarlo	17	63	2013	1994	19
Nguyen	13	16	2011	2003	8
Balhoff	9	13	2013	2005	8

Another way to look at Heidari's research productivity is to plot the papers per calendar year for all PGE faculty in rank as an assistant professor during a given year since 2011 (Figure 1). The assistant professor data I show is exclusive of Heidari, and includes PGE faculty for each year they held the rank of assistant professor, even if they were in that rank for only part of the year. After a faculty's promotion

year, however, I dropped them from the computation. For example, the comparison pool of assistant professors in PGE exclusive of Heidari included eight faculty in 2011 (Balhoff, Daigle, DiCarlo, Espinoza, Foster, Nguyen, Okuno, Prodanovic), falling to four in 2017 (Daigle, Espinoza, Foster, Okuno). Also, it should be noted that 2017 is only a partial year, so the dip in numbers in 2017 is not indicative of what the full year data will likely show.

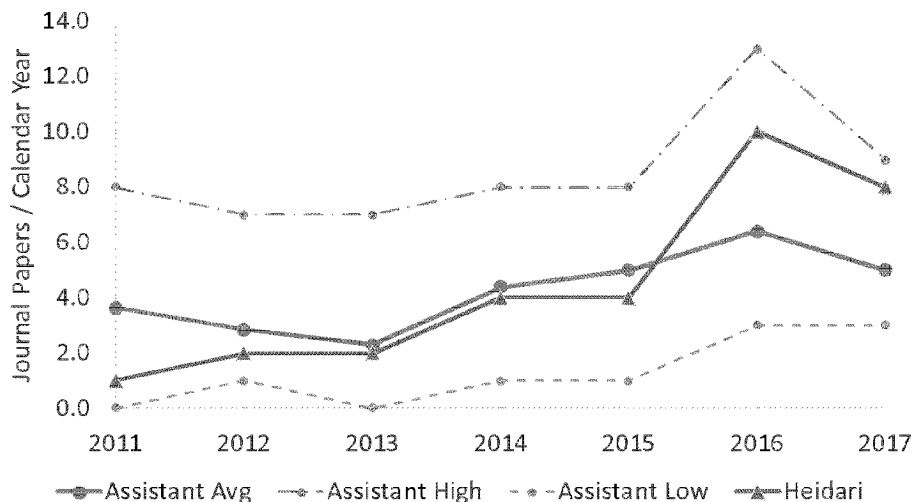


Figure 1. Journal papers published per calendar year for Dr. Heidari compared to other assistant professors in PGE while in rank. (Heidari's data is not included in the average and range for the other assistant professors. 2017 is an incomplete year.)

Figure 1 shows that the number of journal papers published per year has been increasing for Heidari since 2011, peaking in 2016 with 10 published, but her 2017 number of 8 published journal papers could rise as the year is not over. Heidari's early performance is equivalent to the average of the other PGE assistant professors, while her recent performance is significantly above average (but still within the range of the others). In 2016, the PGE associate and full professors averaged about 8.5 journal papers per faculty for the year, so Heidari is performing better than average as compared to those holding higher rank as well. Given that UT is the most productive petroleum engineering department in the country with regard to publication (based on the most recent data provided by the Association of US Petroleum Engineering Department Heads), beating the average here is a significant accomplishment.

In petroleum engineering, conference papers are also an important medium for reporting research results. For conferences of the Society of Petroleum Engineers (SPE) and Society of Petrophysicists and Well Log Analysts (SWPLA), which is where most of Heidari's papers are presented, the acceptance rate is based on abstracts and is very competitive. Acceptance rate is less than 25% for SPE conferences – I wasn't able to find a number for SPWLA. After abstract acceptance, full papers must be written and submitted prior to the conference (there is a no paper, no podium policy). Figure 2 shows that Dr. Heidari has been remarkably productive in writing conference papers as compared to other assistant professors in PGE. Since 2014, she has had at least 11 conference papers per calendar year, which is

about twice the highest number of conference papers per year for the other assistant professors and three times the average. Heidari's conference paper numbers not only exceed the range of the assistant professors, she significantly exceeds the PGE full professor average of 8 conference papers per calendar year (based on 2014 through 2016 data).

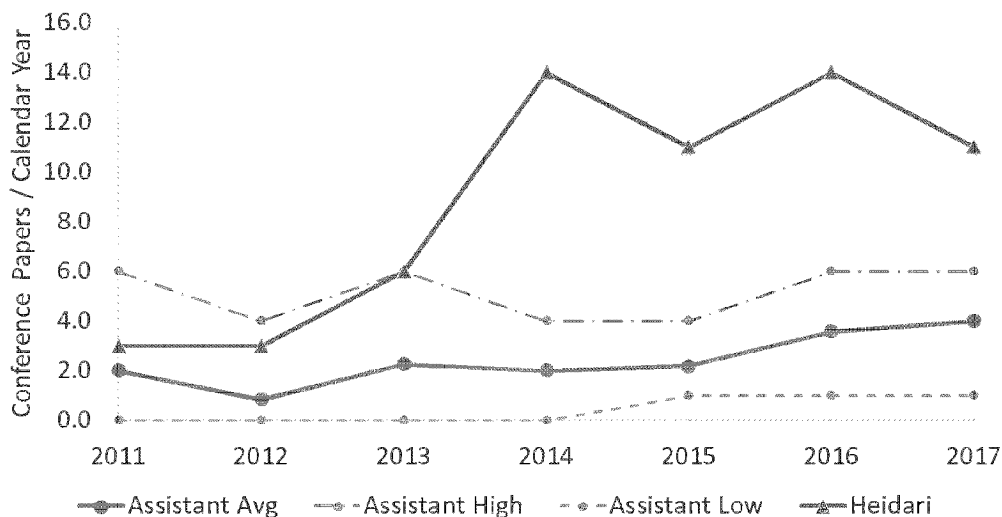


Figure 2. Conference papers published per calendar year for Dr. Heidari and other assistant professors in PGE while in rank as an assistant professor. (Heidari's data is not included in the average and range for the other assistant professors. 2017 is an incomplete year.)

Finally, using 2016 data (the last complete year for which I have data on all faculty), among the 19 tenured and tenure-track faculty in the PGE department of all rank, Heidari would place 6th in journal papers published and tie for 2nd in conference papers published, a great accomplishment for an assistant professor in the #1 graduate petroleum engineering program in the nation (US News and World Report). Dr. Heidari's exceptional productivity was recognized by Dr. Erdal Ozkan (chair of Petroleum Engineering at Colorado School of Mines and chair of the US Association of Petroleum Engineering Department Heads), who made the following assessment in his referee letter: *"The data collected by the Association of the US Petroleum Engineering Department Heads show that the average rate of productivity for the Petroleum Engineering faculty across the US is two to three peer-reviewed publications and three to five conference presentations [per year]. Dr. Heidari's productivity is clearly above the averages."* Dr. Christine Ehlig-Economides (NAE, University of Houston) also commented on productivity in saying, *"I am involved in faculty search at the University of Houston and see files for many faculty applicants. Considering numbers of publications and the level of funding she has attracted, Dr. Heidari's accomplishments soar over the applicants we have seen."*

In addition to her evidence of high productivity, Dr. Heidari has shown clear achievement of quality in her work. Probably the most important sign of work quality is her 2017 SPE International Cedric K. Ferguson Medal, which is given to the best paper from all SPE journals whose author was under the age

of 36. Considering the size of the SPE (membership over 100,000) and the large number of papers published annually in its five peer-reviewed journals, this is a career-highlight achievement. Dr. Russell Johns (program chair of Petroleum and Natural Gas Engineering at Penn State University, also a holder of the Ferguson medal, and a member of the 2016-2017 Ferguson award committee that bestowed the honor on Dr. Heidari) stated in reference to the award, *"I am particularly aware of her recent papers that were evaluated for the Cedric K. Ferguson SPE international award. ...This is a major international award that bodes well for her future.... Besides the SPE award, she has received numerous other research awards that clearly demonstrate her research excellence."* He also stated that *"Zoya's technical papers are of very high quality; her group has developed several important key findings..."*

Publication in good journals also indicates quality work, and Dr. Heidari has placed papers in many of the top journals for our field – SPE Journal, SPE Reservoir Evaluation & Engineering Journal, Geophysics, and AAPG Bulletin, to name a few. Dr. Ozkan's letter highlights this fact in saying, *"Moreover, the journals she publishes in have some of the highest impact factors in the disciplines of geosciences and petroleum engineering."*

Citations are a quantitative way to measure significance and impact of published papers, but their interpretation can be difficult, particularly for young researchers (Heidari is also the youngest in her career of any of our current assistant professors). Heidari's h-index of 10 (Google Scholar) and total citations of 330 (Google Scholar) are slightly below but similar to other PGE assistant professors, whose h-indices range from 11 to 14 and citations range from 386 to 906. A plot of citations versus time (Figure 3), however, shows that she is competitive with the other assistant professors and those most recently promoted to associate. Her cumulative citations (Figure 3b) put her in the middle of her peers when accounting for years since PhD. Dr. Ozkan assessed her h-index and citation numbers in this way: *"A cursory review of the Google Scholar profiles of the assistant professors in the peer US Petroleum Engineering Departments reveals slightly better records than that of Dr. Heidari... [A]lthough... they may not be the best measures to assess the early career achievements of academicians."* I agree with him that Dr. Heidari's numbers are not high, but she is young and the plots I made show her trajectory is not very different than her peers. Combined with her other exceptional indicators of achievement, I do not think the citation data should cause any concern.

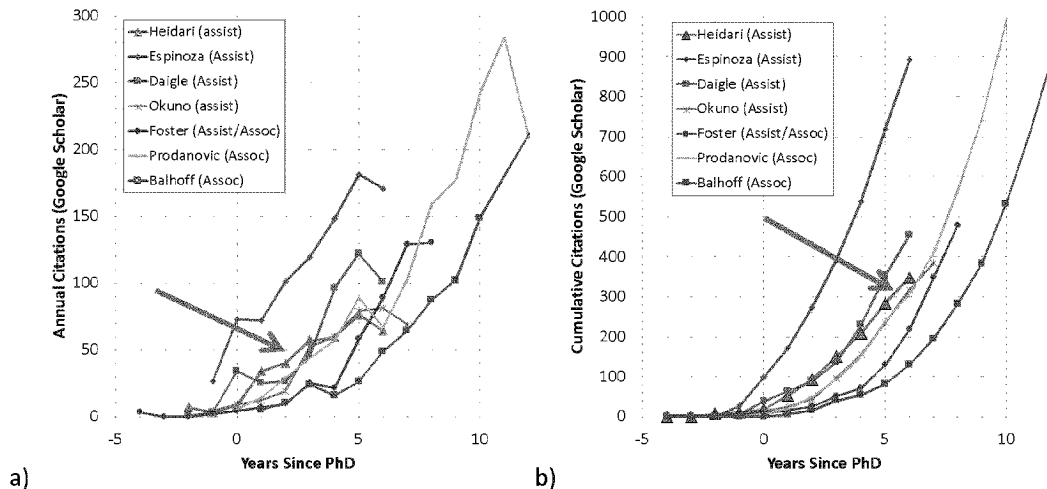


Figure 3. a) Annual and b) cumulative citation data for a range of UT-PGE assistant. The arrow points at Heidari's curve. Data source is Google Scholar, September 18, 2017.

A good research program requires money to support laboratory work and graduate students. Dr. Heidari's in-rank candidate's share of \$3,414,305 is remarkable. Dr. Russel Johns (Penn State) commented, "*Her funding level also greatly exceeds what I would expect from an assistant faculty going up for tenure and promotion.*" Dr. Ozkan adds, "*... her funded research volume amounting to \$3.4 million since 2011 ... is significantly higher than that for most of her peers (~\$300,000/year based on my knowledge) and must be credited to her recognition.*" It is unfortunate that \$838,707 could not be transferred from Texas A&M to UT, much of which was awarded just prior to Heidari's hiring at UT, but the winning of the grants shows capability to support a thriving program. Her money raised at UT so far is modest, \$198,910, but she currently has \$2,323,618 under consideration or negotiation with federal and industry sponsors. Another factor for her money is the fact that the timing of her move to UT could not have been worse – the price of oil dropped by 50% during her first year on the PGE faculty. All of us are finding fund-raising more difficult under these conditions, but things are improving. Also, federal money for oil and gas related research has been virtually non-existent over the past 5 years, with a new request for proposals just released this past summer from the Department of Energy being the first since Heidari joined UT.

The final aspect of Dr. Heidari's research that I want to cover is its broader relevance and importance to society. In my assessment, her focus on improving technologies related to unconventional resources (oil and gas in shales and other previously non-productive rock types) puts her in the midst of the most important energy development in decades, one that has revolutionized and rejuvenated the oil and gas industry in the United States. The prospect that the United States could once again become a net exporter of energy has turned the world petroleum business and economic power structure on its head – it is really quite remarkable. Dr. Heidari's positioning in this field and her impact are best highlighted in these comments of the external reviewers:

- Prof. Martin Blunt (Imperial College) – *“This work is extremely important as it focusses on one of the principal problems in the oil and gas industry, which is how to extract, efficiently, hydrocarbon from unconventional resources. She has founded a joint industry programme on this topic, which has been extremely successful in terms of funds raised, student support and publications. ...Dr. Heidari has pioneered new methods to characterize hydrocarbon-bearing shales, described in a series of excellent papers in the petroleum engineering literature ...[she] is likely to continue to make significant discoveries in the coming years.”*
- Prof. Erdal Ozkan (Colorado School of Mines) – *“...NMR technology ...is considered as one of the most promising approaches for the petrophysical characterization of unconventional reservoirs and Dr. Heidari appears to be at the forefront of the research activities on this topic.”*
- Rolande Horne, NAE (Stanford University) – *“With regard to her publications, I think Prof. Heidari and her students have made significant contributions...”*
- Christine Ehlig-Economides, NAE (University of Houston) – *“Dr. Heidari’s experimental and computational work to quantify the physics of unconventional reservoirs is of the highest importance for the petroleum industry...”*

Overall, my assessment is that Dr. Heidari exceeds expectations with regard to research for promotion to associate professor with tenure.

Chair’s Analysis of Advising, Counseling, and Other Student Service

With regard to graduate student supervision, Dr. Heidari has graduated five PhD students (1 co-supervised) and eight MS students (3 co-supervised) while in rank. All of these students received their degrees from Texas A&M University, but considering A&M is a peer institution and their graduate petroleum engineering program is ranked #2 by US News and World Report (tied with Stanford), this accomplishment is the equivalent of having done the same here at UT Austin. Her two years at UT have not been enough time to graduate a PhD student in our program, but she has been successful at attracting students and they are making progress. She currently supervises 6 PhD and 3 MS students. In addition to her graduate students, she has been involved in mentoring undergraduates in her research program at both A&M and UT (8 students total in rank). Her participation in formal student instruction and outreach programs as described in her statement indicate she is a caring advisor and serves student interests well in her work. I assess that Dr. Heidari meets or exceeds expectations for promotion related to student advising and counseling.

Chair’s Analysis of Administrative and Committee Service

As chair, I have found Dr. Heidari to be willing and responsible in her service to the department. She takes her attendance at faculty meetings and committee meetings seriously, and she has engaged with the faculty to build relationships with her peers. She did an excellent job leading one of our PhD qualifying exam committees last academic year, and she has been a good team player on the graduate admissions and graduate curriculum committees. She has also continued her interest in women in engineering programs that was evident when she was a graduate student here. She is involved in

professional society activities (mostly in SPE and SPWLA), and contributes time to the technical review of journal papers. As department chair, I am very happy with her activities thus far in her career with regard to service, and these accomplishments meet the expectations for promotion.

Chair's Analysis of Honors and Other Evidence of Merit or Recognition

I have already mentioned Dr. Heidari's SPE Ferguson Medal for excellence in research and publication. This is her most significant honor as a young faculty member. Other items worth note are two other major awards from SPE, the 2012 Petroleum Engineering Junior Faculty Research Initiation Award, and the 2015 SPE Innovative Teaching Award. Texas A&M honored her with its Select Young Faculty Fellows award in 2014. She has also received best paper awards and regional professional society awards as outlined in her CV and statement.

In addition to awards, Dr. Heidari's substantial fund-raising is evidence of her recognition by industry and other funding agencies. As already mentioned, her external referees commended her performance in this regard. My assessment is that Dr. Heidari exceeds expectations for promotion to Associate Professor with regard to honors, merit and recognition.


Concluding Statement

This is my third season of writing promotion letters, and Dr. Heidari's case is the most exceptional I have seen in my role as department chair. She has excelled at every aspect of the faculty endeavor, and she has been recognized by others for her achievements. Some final brief excerpts from her letter writers echo my sentiments:

- Prof. Martin Blunt (Imperial College) – *"...I consider that she has the capability and experience to make major contributions.... I consider that promotion with tenure is fully justified."*
- Prof. Erdal Ozkan (Colorado School of Mines, chair of Petroleum Engineering) – *"...Dr. Heidari's credentials place her highly among the applications I have reviewed for promotion and tenure at her rank. I would not expect her to have any problem receiving a positive tenure and promotion decision at our institution."*
- Rolande Horne, NAE (Stanford University, Energy Resources Engineering) – *"Work of her caliber and extent would certainly be competitive for a tenured position as an Associate Professor in our department at Stanford University. ...I have complete admiration for Prof. Heidari's very broad range of achievements and abilities. I therefore have no hesitation in recommending her for a position as Associate Professor, with tenure, in your university."*
- Christine Ehlig-Economides, NAE (University of Houston, petroleum engineering, formerly of Texas A&M) – *"...from my experience on both department and college level promotion and tenure committees, she would easily be awarded promotion and tenure at TAMU or UH."*
- Rosemary Knight (Stanford University, Department of Geophysics) – *"I was struck by the rigor displayed in the analysis of the data... I will likely build on it in my own current work... My overall impression is that Prof. Heidari is an exceptionally talented researcher..."*

- Prof. Chandra Rai (University of Oklahoma, chair of Mewbourne School of Petroleum and Geological Engineering) – *“She compares exceptionally well when compared to others in her position.”*
- Prof. Mike King (Texas A&M University, Petroleum Engineering) – *“...She, and her students, are beginning to make a solid impact on the profession, and I have every reason to believe that Zoya will continue to grow in her professional impact. ... I regret that she is no longer in our department and about to receive tenure here, but I’m very pleased that she is at UT, where I am sure that she will thrive.”*

I enthusiastically support her advancement to associate professor with tenure, I think her work thus far is commendable, and I believe her future potential is significant and will bring praise and recognition to the PGE department, the Cockrell School of Engineering and The University of Texas at Austin.



Jon E. Olson, PhD, P.E.
Department Chair
Petroleum & Geosystems Engineering

Addendum: The following articles listed as in press have now been published.

31. Chen*, H. and Heidari, Z. 2017. Accepted for Publication. Effect of Water Salinity and Water-Filled Pore Volume on High-Frequency Dielectric Measurements in Porous Media. SPE Reservoir Evaluation & Engineering Journal, Formation Evaluation (submitted October 2016, accepted for publication March 6, 2017).

32. Valdes*, C. C., H. and Heidari, Z. 2017. Accepted for Publication. Application of Nanoindentation for Uncertainty Assessment of Elastic Properties in Mudrocks at Micro-scale and Well-log Domains. Geophysics (submitted October 2016, accepted for publication July 17, 2017).

34. An, C., Yan, B., Alfi, M., Mi, L., Heidari, Z., and Killough, J. 2017. Accepted for Publication. Estimating Spatial Distribution of Natural Fractures by Changing NMR T2 Relaxation with Magnetic Nanoparticles. Journal of Petroleum Science and Engineering (submitted December 2016, accepted for publication July 17, 2017).

Mid probationary Review

Mid probationary review for Dr. Zoya Heidari was scheduled for 2017-18.

Department of Petroleum and Geosystems Engineering

THE UNIVERSITY OF TEXAS AT AUSTIN
Cockrell School of Engineering
Standard Resume

FULL NAME: Zoya Heidari **TITLE:** Assistant Professor

DEPARTMENT: Petroleum and Geosystems Engineering

EDUCATION:

The University of Texas at Austin	Petroleum Engineering	Ph.D.	Summer 2011
Sharif University of Technology	Biomechanical Engineering	M.Sc.	Spring 2007
Sharif University of Technology	Mechanical Engineering	B.Sc.	Spring 2005

CURRENT AND PREVIOUS ACADEMIC POSITIONS:

The University of Texas at Austin	Assistant Professor	Fall 2015 – Present
Texas A&M University	Assistant Professor	Fall 2011 – Summer 2015
The University of Texas at Austin	Research Assistant	Fall 2007 – Summer 2011
The University of Texas at Austin	Teaching Assistant	Fall 2010
Sharif University of Technology	Graduate Assistant	Fall 2005 – Summer 2007
Sharif University of Technology	Researcher, RoboCup Humanoid League Research Team	Fall 2003 – Fall 2004

OTHER PROFESSIONAL EXPERIENCE:

Marathon Oil Company	Summer Petrophysicist Intern	Summer 2010
Anadarko Petroleum Corporation	Summer Intern	Summer 2008

HONORS, AWARDS, AND ACHIEVEMENTS:**A. Honors, Awards, and Achievements, in Rank:**

- 2017 recipient of the SPE Cedric K. Ferguson Medal, Society of Petroleum Engineers, July 2017.
 - This international award recognizes professional achievement in petroleum engineering.
- Award of Appreciation for Service and Outstanding Accomplishment as Vice-President of Education on the Board of Directors of SPWLA, Society of Petrophysicists and Well Log Analysts (SPWLA), June 2017.
- Anadarko Petroleum Corporation Centennial Fellowship #1 in Petroleum Engineering, Cockrell School of Engineering, The University of Texas at Austin, September 2016 – Present.
- 2016 SPE Faculty Enhancement Travel Grant (Southwest North America Region), Society of Petroleum Engineers, June 2016.
- 2016 SPE Regional Formation Evaluation Award (Southwest North America Region), Society of Petroleum Engineers, May 2016.
- 2016 SPE Regional Formation Evaluation Award (Gulf Coast North America Region), Society of Petroleum Engineers, May 2016.
- Distinguished Presentation Award, Society of Petrophysicists and Well Log Analysts (SPWLA), May 2015, for the following paper:

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- *Valdes*¹, *C. C.*, *Aderibigbe*^{*}, *A.*, and *Heidari, Z.* 2015. Impact of Anisotropic Elastic and Petrophysical Properties on Stress Prediction in Organic-Rich Mudrocks. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 56th Annual Symposium, Long Beach, California, 18 – 22 July.
- 2015 SPE Innovative Teaching Award, Society of Petroleum Engineers, October 2015.
- One of the recipients of the Engineering Genesis (EG) award, Texas A&M University, May 2015, for contributing in a multi-university and multi-disciplinary research grant “Advanced Computational and Numerical Modeling Techniques for Hydrocarbon Recovery,” which was recognized as one of the top TEES research awards for the year.
- Best Poster Presentation Award at the 2015 HGS Applied Geoscience Conference (AGC), May 2015.
 - *Chen Valdes*^{*}, *C.*, *Aderibigbe*^{*}, *A.*, *Aranibar*^{*}, *A.*, and *Heidari, Z.* 2015. Determination of Anisotropic Poroelasticity in the Haynesville Shale from Well-Log-Based Estimates. Poster presentation at the 2015 HGS Applied Geoscience Conference (AGC), Houston, Texas, 18 May.
- 2014 TEES (Texas A&M Engineering Experiment Station) Select Young Faculty Fellows award, College of Engineering, Texas A&M University, November 2014.

This award recognizes outstanding young faculty members who have demonstrated their talents for research. TEES is an engineering research agency in Texas, and is a member of The Texas A&M University System. Texas A&M engineering faculty hold joint appointments as TEES researchers.
- 2014 Best Paper Poster Award, Society of Petrophysicists and Well Log Analysts (SPWLA), May 2014.
- One of the Distinguished Speakers of the Society of Petrophysicists and Well Log Analysts (SPWLA), 2014 – 2015.
- Recipient of two distinguished presentation awards from the Society of Petrophysicists and Well Log Analysts (SPWLA), May 2014, for the following two papers:
 - *Chen*^{*}, *H.* and *Heidari, Z.* 2014. Pore-Scale Evaluation of Dielectric Measurements in Formations with Complex Pore and Grain Structures. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 55th Annual Symposium, Abu Dhabi, United Arab Emirates, 18 – 22 May.
 - *Cheng*^{*}, *K.*, *Aderibigbe*^{*}, *A.*, *Alfi, M.*, *Heidari, Z.*, and *Killough, J.* 2014. Quantifying the Impact of Petrophysical Properties on Spatial Distribution of Contrasting Nanoparticle Agents. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 55th Annual Symposium, Abu Dhabi, United Arab Emirates, 18 – 22 May.
- 2012 SPE Petroleum Engineering Junior Faculty Research Initiation Award, Society of Petroleum Engineers, August 2012.
- Chevron Corporation Faculty Fellowship in Petroleum Engineering, Texas A&M University, December 2011 – August 2015.

B. Honors, Awards, and Achievements, before Rank:

- 3rd Place of SPWLA Student Poster Competition, Society of Petrophysicists and Well Log Analysts, June 2009.
- Fellowship from the Department of Petroleum and Geosystems Engineering, The University of Texas at Austin, Spring 2009.
- Fellowship from Society of Petrophysicists and Well Log Analysts, Austin Chapter, Spring 2008.
- Fellowship from the Department of Petroleum and Geosystems Engineering, The University of Texas at Austin, Fall 2007.
- Research Grant from Research Center for Science and Technology in Medicine (RCSTIM), Fall 2006.
- Best B.Sc. Thesis Award of the Year from Iranian Society of Mechanical Engineers (Aalinasab award), 2006.

¹ * Indicates graduate students under **Dr. Heidari's** supervision

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- "First Step to Nobel Prize in Physics" Diploma for presentation of the paper "Why Do We See Benham's Colors?," organized under the aegis of the Institute of Physics, Polish Academy of Sciences, 2000.

MEMBERSHIPS IN PROFESSIONAL AND HONORARY SOCIETIES:

- Member, Society of Petroleum Engineers (SPE)
- Member, Society of Petrophysicists and Well Log Analysts (SPWLA)
- Member, Society of Exploration Geophysicists (SEG)
- Member, American Society for Engineering Education (ASEE)

PUBLICATIONS:

A. Refereed Archival Journal Papers:

A.1. Archived Refereed Journal Publications, before Rank: (4)

1. Basafa, E., Heidari, Z., Tamaddoni, H., Mirbageri, A., Haddad, O., and Parnianpour, M. 2007. The Effect of Fatigue on Recurrence Parameters of Postural Sway. *Journal of Biomechanics* **40**: S362. DOI: 10.1016/S0021-9290(07)70357-3
2. Vossoughi, G., Pendar, H., Heidari, Z., and Mohammadi, S. 2008. Assisted Passive Snake-Like Robots: Conception and Dynamic Modeling Using Gibbs-Appell Method. *Robotica* **26** (3): 267 – 276. DOI: 10.1017/S0263574707003864
3. Heidari, Z., Farahmand, F., Arabalibeik, H., and Parnianpour, M. 2008. Adaptive Neuro-Fuzzy Inference System for Classification of ACL-Ruptured Knees Using Arthrometric Data. *Annals of Biomedical Engineering* **36** (9): 1449 – 1457. DOI: 10.1007/s10439-008-9532-x
4. Heidari, Z., Torres-Verdin, C., Mendoza, A., and Wang, G. L. 2011. Assessment of Residual Hydrocarbon Saturation with the Combined Quantitative Interpretation of Resistivity and Nuclear Logs. *Petrophysics* **52** (3): 217 – 237.

A.2. Archived Refereed Journal Publications, in Rank: (26)

5. Heidari, Z., Torres-Verdin, C., and Preeg, W. E. 2012. Improved Estimation of Mineral and Fluid Volumetric Concentrations from Well Logs in Thinly Bedded and Invaded Formations. *Geophysics* **77** (3): WA79 – WA98. DOI: 10.1190/geo2011-0454.1
6. Heidari, Z. and Torres-Verdin, C. 2012. Estimation of Dynamic Petrophysical Properties of Water-Bearing Sands Invaded with Oil-Base Mud from the Interpretation of Multiple Borehole Geophysical Measurements. *Geophysics* **77** (6): D209 – D227. DOI: 10.1190/geo2012-0006.1
7. Heidari, Z. and Torres-Verdin, C. 2013. Inversion-Based Method for Estimating Total Organic Carbon and Porosity and for Diagnosing Mineral Constituents from Multiple Well Logs in Shale-Gas Formations. *Interpretation* **1** (1): T113 – T123. DOI: 10.1190/INT-2013-0014.1
8. Heidari, Z., Torres-Verdin, C., and Preeg, W. E. 2013. Improved Estimation of Mineral and Fluid Volumetric Concentrations in Thinly Bedded Carbonate Formations. *Geophysics* **78** (4): D261 – D269. DOI: 10.1190/geo2012-0438.1
9. Heidari, Z. and Torres-Verdin, C. 2014. Inversion-Based Detection of Bed Boundaries for Petrophysical Evaluation with Well Logs: Applications to Carbonate and Organic-Shale Formations. *Interpretation* **2** (3): T129 – T142. DOI: 10.1190/INT-2013-0172.1
10. Kethireddy^{2*}, N., Chen^{*}, H., and Heidari, Z. 2014. Quantifying the Effect of Kerogen on Resistivity Measurements in Organic-Rich Mudrocks. *Petrophysics* **55** (2): 136 – 146.

^{2*} Indicates graduate students under Dr. Heidari's supervision

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11. Cheng*, K., Aderibigbe*, A., Alfi, M., Heidari, Z., and Killough, J. 2014. Quantifying the Impact of Petrophysical Properties on Spatial Distribution of Contrasting Nanoparticle Agents in the New-Wellbore Region. *Petrophysics* **55** (5): 447 – 460.
12. Chen*, H. and Heidari, Z. 2014. Pore-Scale Evaluation of Dielectric Measurements in Formations with Complex Pore and Grain Structures. *Petrophysics* **55** (6): 587 – 597.
13. Saneifar*, M., Aranibar*, A., and Heidari, Z. 2015. Rock Classification in the Haynesville Shale Based on Petrophysical and Elastic Properties Estimated from Well Logs. *Interpretation* **3** (1): SA65 – SA75. DOI: 10.1190/INT-2013-0198.1
14. Chi*, L. and Heidari, Z. 2015. Diffusional Coupling between Microfractures and Pore Structure and its Impact on Nuclear Magnetic Resonance Measurements in Multi-Porosity Systems. *Geophysics* **80** (1): D31 – D42. DOI: 10.1190/geo2013-0467.1
15. Saneifar*, M., Heidari, Z., and Hill, A. D. 2015. Application of Conventional Well Logs to Characterize Spatial Heterogeneity in Carbonate Formations Required for Prediction of Acid-Fracture Conductivity. *SPE Production and Operations Journal* **30** (3): 243 – 256. DOI:10.2118/173183-PA
16. Saneifar*, M., Conte, R., Valdes, C. C., Heidari, Z., and Pope, M. C. 2015. Integrated Rock Classification in Carbonate Formations Based on Elastic and Petrophysical Properties Estimated from Conventional Well Logs. *AAPG Bulletin* **99** (7): 1261 – 1280. DOI: 10.1306/02091514167
17. Chen*, H. and Heidari, Z. 2016. Quantifying the Directional Connectivity of Rock Constituents and its Impact on Electrical Resistivity of Organic-Rich Mudrocks. *Mathematical Geosciences* **48** (3): 285 – 303. DOI: 10.1007/s11004-015-9595-9
18. Chi*, L., Cheng*, K., and Heidari, Z. 2016. Improved Assessment of Interconnected Porosity in Multiple-Porosity Rocks by Use of Nanoparticle Contrast Agents and Nuclear-Magnetic-Resonance Relaxation Measurements. *SPE Reservoir Evaluation & Engineering Journal, Formation Evaluation* **19** (1): 95 – 107. DOI: 10.2118/170792-PA
19. Oyewole*, E., Saneifar*, M., and Heidari, Z. 2016. Multiscale Characterization of Pore Structure in Carbonate Formations: Application to the Scurry Area Canyon Reef Operators Committee Unit. *Interpretation* **4** (2): T157 – T169. DOI: 10.1190/INT-2015-0123.1
20. Chi*, L. and Heidari, Z. 2016. Directional-Permeability Assessment in Formations with Complex Pore Geometry With a New Nuclear-Magnetic-Resonance-Based Permeability Model. *SPE Journal* **21** (4): 1436 – 1449. DOI: 10.2118/179734-PA
21. Aderibigbe*, A., Cheng*, K., Heidari, Z., Killough, J., and Fuss-Dezelic, T. 2016. Application of Magnetic Nanoparticles mixed with Propping Agents in Enhancing Near-Wellbore Fracture Detection. *Journal of Petroleum Science and Engineering* **141**: 133 – 143.
22. Chen*, H. and Heidari, Z. 2016. Pore-Scale Joint Evaluation of Dielectric Permittivity and Electrical Resistivity for Assessment of Hydrocarbon Saturation Using Numerical Simulations. *SPE Journal* **21** (6): 1930 – 1942. DOI: 10.2118/170973-PA
23. Aderibigbe*, A., Chen Valdes*, C., Heidari, Z., and Fuss-Dezelic, T. 2016. Mechanical-Damage Characterization in Proppant Packs by Use of Aconstic Measurements. *SPE Production & Operations Journal* **32** (2): 168 – 176. DOI: 10.2118/181763-PA
24. Aderibigbe*, A., Valdes*, C. C., and Heidari, Z. 2016. Integrated Rock Classification in the Wolfcamp Shale based on Reservoir Quality and Anisotropic Stress Profile Estimated from Well Logs. *Interpretation* **4** (2): SF1 – SF18. DOI: 10.1190/INT-2015-0138.1
25. Valdes*, C. C., Aderibigbe*, A., and Heidari, Z. 2016. Impact of Anisotropic Porelastic Parameters Estimated using Well Logs and Core Measurements on Stress Prediction in Organic-Rich Mudrocks. *Interpretation* **4** (3): T359 – T372. DOI: 10.1190/INT-2015-0122.1
26. Saneifar*, M., Heidari, Z., Linroth, M., and Purba*, S. A. 2017. Effect of Heterogeneity on Fluid Injectivity Loss during Water-Alternating-Gas Injection in the Scurry Area Canyon Reef Operators Committee Unit. *SPE Reservoir Evaluation & Engineering Journal, Formation Evaluation* **20** (2): 293 – 303. DOI: 10.2118/175064-PA
27. Yang*, A., Firdaus*, G., and Heidari, Z. 2016. Electrical Resistivity and Chemical Properties of Kerogen Isolated from Organic-Rich Mudrocks. *Geophysics* **81** (6): D643 – D655. DOI: 10.1190/geo2016-0071.1

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28. Cheng*, K. and Heidari, Z. 2017. (Published Online, May 2017). Pore-Network Connectivity and Permeability Assessment by Use of Nuclear Magnetic Resonance Log-Inject-Log Method. *SPE Reservoir Evaluation & Engineering Journal, Formation Evaluation*. DOI: 10.2118/175066-PA
29. Cheng*, K. and Heidari, Z. 2017. Combined Interpretation of NMR and TGA Measurements to Quantify the Impact of Relative Humidity on Hydration of Clay Minerals. *Applied Clay Science Journal* **143**: 362 – 371. DOI: 10.1016/j.clay.2017.04.006
30. Tang, H., Killough, J., Heidari, Z., and Sun, Z. 2017. (Published Online, April 2017). A New Technique To Characterize Fracture Density by Use of Neutron Porosity Logs Enhanced by Electrically Transported Contrast Agents. *SPE Journal* (submitted August 2016, accepted for publication January 13, 2017). DOI: 10.2118/181509-PA

A.3. Refereed Journal Publications in Press, in Rank: (4)

31. Chen*, H. and Heidari, Z. 2017. *Accepted for Publication*. Effect of Water Salinity and Water-Filled Pore Volume on High-Frequency Dielectric Measurements in Porous Media. *SPE Reservoir Evaluation & Engineering Journal, Formation Evaluation* (submitted October 2016, accepted for publication March 6, 2017).
32. Valdes*, C. C., H. and Heidari, Z. 2017. *Accepted for Publication*. Application of Nanoindentation for Uncertainty Assessment of Elastic Properties in Mudrocks at Micro-scale and Well-log Domains. *Geophysics* (submitted October 2016, accepted for publication July 17, 2017).
33. Jagadisan*, A., Yang*, A., Heidari, Z. 2017. *Accepted for Publication*. An Experimental Approach to Quantify the Impact of Kerogen Maturity on its Chemical Aromaticity and Electrical Conductivity. *Petrophysics* (submitted November 2016, accepted for publication July 27, 2017).
34. An, C., Yan, B., Alfi, M., Mi, L., Heidari, Z., and Killough, J. 2017. *Accepted for Publication*. Estimating Spatial Distribution of Natural Fractures by Changing NMR T2 Relaxation with Magnetic Nanoparticles. *Journal of Petroleum Science and Engineering* (submitted December 2016, accepted for publication July 17, 2017).

A.4. Refereed Journal Publications Currently Under Review, in Rank: (5)

35. Amin*, S., Wehner, M., Heidari, Z., and Tice, M. 2017. *Under Review*. Rock Classification in the Eagle Ford Shale through Integration of Petrophysical, Geological, and Geochemical Characterization. *AAPG Bulletin* (submitted December 2016).
36. Tandon*, S., Heidari, Z., Aderibigbe*, A., Shi, J., and Fuss, T. 2016. *Under Review*. Proppant Damage Characterization using Nuclear Magnetic Resonance Measurements. *SPE Production and Operations Journal* (submitted May 2017).
37. Garcia*, A. P. and Heidari, Z. 2017. *Publishable with Revisions*. Quantification of Directional Pore Network Connectivity and Rock Fabric and its Application in Enhanced Assessment of Hydrocarbon Reserves. *SPE Journal* (submitted February 2017).
38. Tandon*, S. and Heidari, Z. 2017. *Publishable with Revisions*. Impact of Internal Magnetic Gradients on Nuclear Magnetic Resonance Measurements and NMR-based Pore Network Characterization. *SPE Reservoir Evaluation & Engineering Journal, Formation Evaluation* (submitted February 2017).
39. Garcia*, A. P., Heidari, Z., and Rostami***, A. 2017. *Under Review*. Improved Assessment of Hydrocarbon Saturation in Mixed-Wet Rocks with Complex Pore Structure. *Petrophysics* (submitted July 2017).

B. Refereed Conference Proceedings:

B.1. Refereed Conference Proceedings, before Rank: (11)

1. Vossoughi, G., Pendar, H., Heidari, Z., and Mohammadi, S. 2005. Conception and Dynamic Modeling of an Assisted Passive Snake-Like Robot Using Gibbs-Appell Method. Presented at the 29th Mechanisms and Robotics Conference, American Society of Mechanical Engineers (ASME), Long Beach, California, 24 – 28 September.

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2. Heidari, Z. and Farahmand, F. 2007. Presenting a Novel Method to Diagnose Knee Laxity Using ANFIS. Presented at ICBME, Tehran, Iran.
3. Basafa, E., Heidari, Z., Tamaddoni, H., Mirbagheri, A., Haddad, O., and Parnianpour, M. 2007. The Effect of Fatigue on Recurrence Parameters of Postural Sway. Presented at ISB, Taipei, Taiwan, 1 – 5 July.
4. Mohammadi, S., Heidari, Z., Pendar, H., Alasty, A., and Vossoughi, G. 2007. Optimal Control of an Assisted Passive Snake-Like Robot Using Feedback Linearization. Presented at the 31st Mechanisms and Robotics Conference, American Society of Mechanical Engineers (ASME), Las Vegas, Nevada, 4 – 7 September.
5. Heidari, Z., Torres-Verdin, C., Mendoza, A., and Wang, G. L. 2009. Improving the Assessment of Residual Hydrocarbon Saturation with the Combined Quantitative Interpretation of Resistivity and Nuclear Logs. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 50th Annual Symposium, The Woodlands, Texas, 21 – 24 June.
6. Heidari, Z., Torres-Verdin, C., Mendoza, A., Ijasan, O., Voss, B., and Preeg, W. E. 2009. Rapid, Interactive Assessment of Petrophysical and Geometrical Effects on Density and Neutron Logs Acquired in Vertical and Deviated Wells. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), New Orleans, Louisiana, 4 – 7 October. SPE 124879.
7. Heidari, Z., Torres-Verdin, C., and Preeg, W. E. 2010. Improved Estimation of Mineral and Fluid Volumetric Concentrations in Thinly-Bedded and Invaded Formations. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 51st Annual Symposium, Perth, Australia, 19 – 23 June.
8. Heidari, Z. and Torres-Verdin, C. 2010. Estimation of Dynamic Petrophysical Properties of Water-Bearing Sands Invaded with Oil-Base Mud from Multi-Physics Borehole Geophysical Measurements. Presented at the 80th SEG International Exposition and Annual Meeting: Society of Exploration Geophysicists (SEG), Denver, Colorado, 17 – 22 October.
9. Marouby, P., Heidari, Z., and Torres-Verdin, C. 2011. Assessment of In-Situ Elastic Properties of Hydrocarbon-Bearing Shale with the Joint Quantitative Interpretation of Sonic, Nuclear, and Resistivity Logs. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 52nd Annual Symposium, Colorado Springs, Colorado, 14 – 18 May.
10. Heidari, Z., Torres-Verdin, C., and Preeg, W. E. 2011. Quantitative Method for Estimating Total Organic Carbon and Porosity, and for Diagnosing Mineral Constituents from Well Logs in Shale-Gas Formations. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 52nd Annual Symposium, Colorado Springs, Colorado, 14 – 18 May.
11. Heidari, Z., Hamman, J. G., Day, P. I., Gorney, D. L., and Alfred, D. 2011. Assessment of Movable Gas Saturation and Rock Typing Based on the Combined Simulation of Petrophysical Borehole Measurements. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 52nd Annual Symposium, Colorado Springs, Colorado, 14 – 18 May.

B.2. Refereed Conference Proceedings, in Rank: (59)

12. Popielski, A. C., Heidari, Z., and Torres-Verdin, C. 2012. Rock Classification from Conventional Well Logs in Hydrocarbon-Bearing Shale. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), San Antonio, Texas, 8 – 10 October. SPE 159255.
13. Xu, C., Heidari, Z., and Torres-Verdin, C. 2012. Rock Classification in Carbonate Reservoirs Based on Static and Dynamic Petrophysical Properties Estimated from Conventional Well Logs. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), San Antonio, Texas, 8 – 10 October. SPE 159991.
14. Heidari, Z. and Torres-Verdin, C. 2012. Improved Detection of Bed Boundaries for Petrophysical Evaluation with Well Logs: Applications to Carbonate and Organic-Shale Formations. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), San Antonio, Texas, 8 – 10 October. SPE 159197.
15. Saneifar*, M. and Heidari, Z. 2013. Permeability Assessment in Carbonate Formations Using Conventional Well Logs Required for Prediction of Acid Fracture Conductivity. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 54th Annual Symposium, New Orleans, Louisiana, 22 – 26 June.
16. Kethireddy*, N., Heidari, Z., and Chen*, H. 2013. Quantifying the Effect of Kerogen on Electrical Resistivity Measurements in Organic-Rich Source Rocks. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 54th Annual Symposium, New Orleans, Louisiana, 22 – 26 June.

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17. *Aranibar*, A., Saneifar*, M., and Heidari, Z.* 2013. Petrophysical Rock Typing in Organic-Rich Source Rocks Using Well Logs. Presented at the Unconventional Resources Technology Conference, Denver, Colorado, 12 – 14 August. SPE 168913 / URTeC 1619574.
18. *Chen*, H., Kethireddy*, N., and Heidari, Z.* 2013. Impact of Spatial Distribution of Kerogen Network on Electrical Resistivity of Organic-Rich Source Rocks. Presented at the Unconventional Resources Technology Conference, Denver, Colorado, 12 – 14 August. SPE 168923/ URTeC 1619806.
19. *Elliott**³, M., Everett, M., and Heidari, Z.* 2013. Forward Modeling of Induction Log Responses for Natural and Hydraulic Fractures. Presented at the 12th Scientific Assembly of International Association of Geomagnetism and Aeronomy (IAGA), Merida Yucatan, Mexico, 26 – 31 August. (Not a full-length paper)
20. *Saneifar*, M., Aranibar*, A., and Heidari, Z.* 2013. Rock Classification in the Haynesville Shale-Gas Formation Based on Petrophysical and Elastic Rock Properties Estimated from Well Logs. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), New Orleans, Louisiana, 30 September – 2 October. SPE 166328.
21. *Chi*, L. and Heidari, Z.* 2014. Quantifying the Impact of Natural Fractures and Pore Structure on NMR Measurements in Multiple-Porosity Systems. Presented at the SPE International Petroleum Technology Conference, Doha, Qatar, 20 – 22 January. IPTC 17688.
22. *Chen*, H., Firdaus*, G., and Heidari, Z.* 2014. Impact of Anisotropic Nature of Organic-Rich Source Rocks on Electrical Resistivity Measurements. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 55th Annual Symposium, Abu Dhabi, United Arab Emirates, 18 – 22 May.
23. *Cheng*, K., Aderibigbe*, A., Alfi, M., Heidari, Z., and Killough, J.* 2014. Quantifying the Impact of Petrophysical Properties on Spatial Distribution of Contrasting Nanoparticle Agents. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 55th Annual Symposium, Abu Dhabi, United Arab Emirates, 18 – 22 May.
24. *Saneifar*, M., Conte, R., Chen, C., Heidari, Z., and Pope, M. C.* 2014. Integrated Rock Classification in Carbonate Formations Based on Elastic and Petrophysical Properties Estimated from Conventional Well Logs. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 55th Annual Symposium, Abu Dhabi, United Arab Emirates, 18 – 22 May.
25. *Chi*, L. and Heidari, Z.* 2014. Directional Permeability Assessment in Formations with Complex Pore Geometry Using a New NMR-Based Permeability Model. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 55th Annual Symposium, Abu Dhabi, United Arab Emirates, 18 – 22 May.
26. *Chen*, H. and Heidari, Z.* 2014. Pore-Scale Evaluation of Dielectric Measurements in Formations with Complex Pore and Grain Structures. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 55th Annual Symposium, Abu Dhabi, United Arab Emirates, 18 – 22 May.
27. *Chi*, L., Elliott**, M., Heidari, Z., and Everett, M.* 2014. Assessment of Micro-Fracture Density using Combined Interpretation of NMR Relaxometry and Electromagnetic Logs. Presented at the Unconventional Resources Technology Conference, Denver, Colorado, 25 – 27 August. URTeC 1922804.
28. *Aranibar*, A., Valdes*, C. C. and Heidari, Z.* 2014. Well-Log-Based Assessment of Elastic Properties in Organic-Shale Formations. Presented at the Unconventional Resources Technology Conference, Denver, Colorado, 25 – 27 August. URTeC 1922955.
29. *Valdes*, C. C. and Heidari, Z.* 2014. Experimental Assessment of Elastic Properties and Minimum Horizontal Stress in the Haynesville Shale-Gas Formation. Presented at the Unconventional Resources Technology Conference, Denver, Colorado, 25 – 27 August. URTeC 1922664.
30. *Elliott**, M., Everett, M., and Heidari, Z.* 2014. Modeling the Effects of Anomalous Electromagnetic Diffusion on Induction Logs: The Next Step in Mapping Natural Fracture Corridors. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Amsterdam, The Netherlands, 27 – 29 October. SPE 170950.
31. *Chen*, H. and Heidari, Z.* 2014. Assessment of Hydrocarbon Saturation in Organic-Rich Source Rocks using Combined Interpretation of Dielectric and Electrical Resistivity Measurements. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Amsterdam, The Netherlands, 27 – 29 October. SPE 170973.

³ ** Indicates undergraduate students under **Dr. Heidari's** supervision

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32. *Cheng*, K., Chi*, L., and Heidari, Z.* 2014. Improved Assessment of Pore-Size Distribution and Pore Connectivity in Multiple-Porosity Systems using Superparamagnetic Iron Oxide Nanoparticles and NMR Measurements. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Amsterdam, The Netherlands, 27 – 29 October. SPE 170792.
33. *Aderibigbe*, A., Cheng*, K., Heidari, Z., Killough, J. E., Fuss, T., and Stephens, W.* 2014. Detection of Propping Agents in Fractures using Magnetic Susceptibility Measurements Enhanced by Magnetic Nanoparticles. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Amsterdam, The Netherlands, 27 – 29 October. SPE 170818.
34. *Aderibigbe*, A., Valdes*, C. C., Heidari, Z., and Fuss, T.* 2014. Mechanical Damage Characterization in Proppant Packs Using Acoustic Measurements. Presented at the International Petroleum Technology Conference, Kuala Lumpur, Malaysia, 10 – 12 December. IPTC 18092.
35. *An, C., Alfi, M., Yan, B., Cheng*, K., Heidari, Z., and Killough, J. E.* 2015. Modeling of Magnetic Nanoparticle Transport in Shale Reservoirs. Presented at the Society of Petroleum Engineers (SPE) Reservoir Simulation Symposium, Houston, Texas, 23 – 25 February. SPE 173282.
36. *Chen*, H. and Heidari, Z.* 2015. Impact of Water Salinity on High-Frequency Dielectric Measurements in Rock-Fluid Mixtures. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 56th Annual Symposium, Long Beach, California, 18 – 22 July.
37. *Valdes*, C. C., Aderibigbe*, A., and Heidari, Z.* 2015. Impact of Anisotropic Elastic and Petrophysical Properties on Stress Prediction in Organic-Rich Mudrocks. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 56th Annual Symposium, Long Beach, California, 18 – 22 July.
38. *Chi*, L. and Heidari, Z.* 2015. Impact of Fracture-Pore Diffusional Coupling on NMR-based Permeability Assessment. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 56th Annual Symposium, Long Beach, California, 18 – 22 July.
39. *Oyewole*, E., Saneifar*, M., and Heidari, Z.* 2015. Multi-Scale Characterization of Pore Structure in Carbonate Formations: Application to the SACROC Unit. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 56th Annual Symposium, Long Beach, California, 18 – 22 July.
40. *Aderibigbe*, A., Amin**, S., Zeng, Z., Wehner, M., Xu, G., Maulana, I., Conte, R., Heidari, Z., Tice, M., and Laya, J. C.* 2015. Integrated Rock Classification in the Eagle Ford Shale Formation Using Well Logs and Geological Evaluation. Presented at the AAPG/SEG/PESA 2015 International Conference & Exhibition, Melbourne, Australia, 13 – 16 September.
41. *Cheng*, K. and Heidari, Z.* 2015. Pore Connectivity and Permeability Assessment in Carbonate Formations using NMR Log-Inject-Log Method. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Houston, Texas, 28 – 30 September. SPE 175066.
42. *Firdaus*, G. and Heidari, Z.* 2015. Quantifying Electrical Resistivity of Isolated Kerogen from Organic-Rich Mudrocks using Laboratory Experiments. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Houston, Texas, 28 – 30 September. SPE 175078.
43. *Chi*, L., Heidari, Z., and Garcia, A. P.* 2015. Investigation of Wettability and Fluid Distribution in Organic-rich Mudrocks using NMR Two-Phase Simulation. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Houston, Texas, 28 – 30 September. SPE 175077.
44. *Saneifar*, M., Heidari, Z., and Linroth, M.* 2015. An Investigation on the Impact of Heterogeneity on Fluid Injectivity Loss during Water-Alternating-Gas Injection in Carbonate Formations. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Houston, Texas, 28 – 30 September. SPE 175064.
45. *Hanafy, A., Ali*, A., Nasr-el-Din, H. A., and Heidari, Z.* 2015. Evaluating the Effects of Acid Stimulation Treatment Before and After Fines Migration on Petrophysical Properties in Sandstone Reservoirs. Presented at the SPE International Petroleum Technology Conference, Doha, Qatar, 6 – 9 December. IPTC 18569.
46. *Garcia*, A. P. and Heidari, Z.* 2016. A Streamline-based Approach for Evaluation of Electrical Tortuosity of Porous Media Using Electrical Conductivity. Presented at the InterPore 8th International Conference on Porous Media and Annual Meeting, Cincinnati, Ohio, 9 – 12 May. (Not a full-length paper)
47. *Tandon*, S., Aderibigbe*, A., Heidari, Z., Shi, J., and Fuss, T.* 2016. Proppant Damage Characterization using Nuclear Magnetic Resonance Measurements. Presented at the American Association of Petroleum Geologists (AAPG) Annual Convention & Exhibition, Calgary, Alberta, Canada, 19 – 22 June.

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48. *Kotb**, A., *Garcia**, A. P., and Heidari, Z. 2016. Multi-Scale Interpretation of Electrical Resistivity Measurements in the Presence of Complex Pore Structure and Anisotropy. Presented at the American Association of Petroleum Geologists (AAPG) Annual Convention & Exhibition, Calgary, Alberta, Canada, 19 – 22 June.
49. *Oyewole**, E., *Garcia**, A. P., and Heidari, Z. 2016. A New Method for Assessment of Directional Permeability and Conducting Pore Network using Electric Conductance in Porous Media. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 57th Annual Symposium, Reykjavik, Iceland, 25 – 29 June.
50. *Cheng**, K. and Heidari, Z. 2016. An Experimental Approach to Quantify the Impact of Relative Humidity on Hydration of Clay Minerals Using NMR- and TGA- Based Evaluations. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 57th Annual Symposium, Reykjavik, Iceland, 25 – 29 June.
51. *Valdes**, C. C. and Heidari, Z. 2016. An Experimental Multi-Scale Approach for Assessment of Uncertainty in Elastic Properties of Organic-Rich Mudrocks. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 57th Annual Symposium, Reykjavik, Iceland, 25 – 29 June.
52. *Yang**, A. and Heidari, Z. 2016. Experimental Quantification of the Impact of Thermal Maturity on Kerogen Density. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 57th Annual Symposium, Reykjavik, Iceland, 25 – 29 June.
53. *Amin**, S., Wehner, M., Heidari, Z., and Tice, M. 2016. Rock Classification in the Eagle Ford Shale through Integration of Petrophysical, Geological, and Geochemical Characterization. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 57th Annual Symposium, Reykjavik, Iceland, 25 – 29 June.
54. *Yang**, A. and Heidari, Z. 2016. An Experimental Approach to Quantify the Impact of Kerogen Maturity on its Chemical Aromaticity and Electrical Conductivity. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 57th Annual Symposium, Reykjavik, Iceland, 25 – 29 June.
55. *Dabidian*****, N., Heidari, Z., and *Yang**, A. 2016. Quantifying the Impact of Thermal Maturity on Dielectric Permittivity of Pure Kerogen in Organic-Rich Mudrocks. Presented at the Unconventional Resources Technology Conference (URTeC), San Antonio, Texas, 1 – 3 August. URTeC 2460670.
56. Tang, H., Killough, J., Heidari, Z., and Sun, Z., 2016. A New Technique to Characterize Fracture Density Using Neutron Porosity Logs Enhanced by Electrically-Transported Contrast Agents. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Dubai, UAE, 26 – 28 September. SPE 181509.
57. *Tandon**, S. and Heidari, Z. 2016. Impact of Internal Magnetic Field Gradients on Nuclear Magnetic Resonance Measurements and NMR-based Pore Network Characterization. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Dubai, UAE, 26 – 28 September. SPE 181532.
58. *Garcia**, A. P. and Heidari, Z. 2016. Directional Pore Network Connectivity and Rock Fabric Characterization and its Application in Enhanced Assessment of Hydrocarbon Reserves. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Dubai, UAE, 26 – 28 September. SPE 181571.
59. Matenoglou, G., Kelessidis, V. C., *Garcia**, A. P., Heidari, Z., Fardis, M., Anastasiou, A., and Papavassiliou, G. 2016. Advanced NMR and MRI Methodologies for Wettability Characterization in Carbonate Reservoirs. Presented at the SPE International Petroleum Technology Conference, Bangkok, Thailand, 14 – 16 November. IPTC 18853.
60. *Purba**, S. A., *Garcia**, A. P., and Heidari, Z. 2017. Improved Permeability Assessment using Directional Rock Fabric Quantification. Presented at the American Association of Petroleum Geologists (AAPG) Annual Convention & Exhibition, Houston, Texas, 2 – 5 April.
61. *Jagadisan**, A. and Heidari, Z. 2017. Application of X-Ray Photoelectron Spectroscopy in Connecting Thermal Maturity of Kerogen to its Dielectric Constant in Organic-Rich Mudrocks. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 58th Annual Symposium, Oklahoma City, Oklahoma, 17 – 21 June.
62. *Tandon**, S. and Heidari, Z., and Matenoglou, G. 2017. Pore-Scale Numerical Modeling of Nuclear Magnetic Resonance Response in Rocks with Complex Pore Structure using Finite Volume Method. Presented at the

⁴ *** Indicates postdoctoral researchers or visiting scholars under **Dr. Heidari's** supervision

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- Society of Petrophysicists and Well Log Analysts (SPWLA) 58th Annual Symposium, Oklahoma City, Oklahoma, 17 – 21 June.
63. *Valdes**, C. C. and Heidari, Z., and *Gonzalez**, A. 2017. Quantifying the Impacts of Thermal Maturity on Elastic Properties of Kerogen. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 58th Annual Symposium, Oklahoma City, Oklahoma, 17 – 21 June.
 64. *Garcia**, A. P., Heidari, Z., and *Rostami****, A. 2017. Improved Assessment of Hydrocarbon Saturation in Mixed-Wet Rocks with Complex Pore Structure. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 58th Annual Symposium, Oklahoma City, Oklahoma, 17 – 21 June.
 65. *Purba**, S. A., *Garcia**, A. P., and Heidari, Z. 2017. New Method for Rock Classification in Carbonate Formations using Well-Log-Based Rock Fabric Quantification. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 58th Annual Symposium, Oklahoma City, Oklahoma, 17 – 21 June.
 66. *Cheng**, K. and Heidari, Z. 2017. A New Method for Quantifying Cation Exchange Capacity in Clay Minerals. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 58th Annual Symposium, Oklahoma City, Oklahoma, 17 – 21 June.
 67. *Garcia**, A. P., *Jagadisan**, A., *Rostami****, A., and Heidari, Z. 2017. A New Resistivity-based Model for Improved Hydrocarbon Saturation Assessment in Clay-Rich Formations using Quantitative Clay Network Geometry and Rock Fabric. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 58th Annual Symposium, Oklahoma City, Oklahoma, 17 – 21 June.
 68. *Tandon**, S., Heidari, Z., and Daigle, H. 2017. Pore-Scale Evaluation of Nuclear Magnetic Resonance Measurements in Organic-Rich Mudrocks Using Numerical Modeling. Presented at the Unconventional Resources Technology Conference (URTeC), Austin, Texas, 24 – 26 July.
 69. *Garcia**, A. P., *Jagadisan**, A., *Rostami****, A., and Heidari, Z. 2017. A New Workflow for Improved Water Saturation Assessment in Organic-Rich Mudrocks Honoring Rock Fabric. Presented at the Unconventional Resources Technology Conference (URTeC), Austin, Texas, 24 – 26 July.
 70. *Tandon**, S., *Rostami****, A., and Heidari, Z. 2017. A New NMR-based Method for Wettability Assessment in Mixed-Wet Rocks. To be presented at the SPE Annual Technical Conference and Exhibition (ATCE), San Antonio, Texas, 9 – 11 October. SPE 187373.

C. Other Major Publications (Non-Refereed Journal Publications): (1)

1. *Aderibigbe**, A., *Valdes**, C. C., and Heidari, Z. 2015. Acoustic Measurements Aid Mechanical Damage Characterization in Proppant Packs. *Journal of Petroleum Technology* **67** (11): 82 – 85.

D. Technical Reports: (7)

1. Heidari, Z. 2013. Annual report. Improved Subsurface Hydrocarbon Estimation in Organic-Rich Source Rocks Using Combined Interpretation of Well Logs and Core Measurements: Society of Petroleum Engineers, College Station, Texas, 28 April.
2. Heidari, Z. 2013. Annual report. The Texas A&M University Joint Industry Research Program (JIP) on “Multi-Scale Formation Evaluation of Unconventional and Carbonate Reservoirs,” College Station, Texas, 20 May.
3. Heidari, Z. 2014. Annual report. The Texas A&M University Joint Industry Research Program (JIP) on “Multi-Scale Formation Evaluation of Unconventional and Carbonate Reservoirs,” College Station, Texas, 14 May.
4. Heidari, Z. 2015. Annual report. The Texas A&M University Joint Industry Research Program (JIP) on “Multi-Scale Formation Evaluation of Unconventional and Carbonate Reservoirs,” College Station, Texas, 4 – 5 June.
5. Heidari, Z. 2015. Annual report. Impact of Organic-Matter Spatial Connectivity on Electrical Properties of Organic-Rich Source Rocks: American Chemical Society, ACS PRF Doctoral New Investigator (DNI) Research Grant, Austin, Texas, 1 October.

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6. Heidari, Z. 2016. Annual report. Impact of Organic-Matter Spatial Connectivity on Electrical Properties of Organic-Rich Source Rocks: American Chemical Society, ACS PRF Doctoral New Investigator (DNI) Research Grant, Austin, Texas, 3 October.
7. Heidari, Z. 2017. Annual report. Industrial Affiliates Research Program (IAP) on “Multi-Scale Rock Physics,” The University of Texas at Austin, Austin, Texas, 16 August.

ORAL PRESENTATIONS:**A. Invited*****A.1. Invited Graduate Seminars, in Rank:***

- Heidari, Z. 2017. Formation Evaluation and Characterization in Unconventional Reservoirs. Oral presentation at TAMU-SPE Student Chapter, Harold Vance Department of Petroleum Engineering, Texas A&M University, College Station, Texas, 23 October.
- Heidari, Z. 2016. Hydrocarbon Reserves Evaluation in Anisotropic Formations with Complex Pore Geometry and Composition using Electrical Measurements. Oral presentation (Graduate Seminar) at the Energy Resources Engineering Department of Stanford University, Stanford, California, 16 May.
- Heidari, Z. 2016. Hydrocarbon Reserves Evaluation in Anisotropic Formations with Complex Pore Geometry and Composition using Electrical Measurements. Oral presentation (Graduate Seminar) at the Chemical and Petroleum Engineering Department of The University of Kansas, Lawrence, Kansas, 10 March.
- Heidari, Z. 2015. Interpretation of Nuclear Magnetic Resonance (NMR) Measurements in Formations with Complex Pore Geometry. Oral presentation at the Graduate Seminar Series, Department of Petroleum and Geosystems Engineering, The University of Texas at Austin, Austin, Texas, 12 September.
- Heidari, Z. 2014. Multi-Scale Formation Evaluation of Unconventional Reservoirs. Oral presentation (Graduate Seminar) at The University of Tulsa, Tulsa, Oklahoma, 10 October.
- Heidari, Z. and Torres-Verdín, C. 2011. Estimation of Dynamic Petrophysical Properties of Water-Bearing Sands Invaded with Oil-Based Mud from Multi-Physics Borehole Geophysical Measurements. Oral presentation at the Graduate Seminar Series, Harold Vance Department of Petroleum Engineering, Texas A&M University, College Station, Texas, 27 September.

A.2. Invited Workshops, in Rank:

- Heidari, Z. 2017. Introduction to Formation Evaluation. Workshop given at the Geology and Geophysics Department of Texas A&M University, College Station, Texas, 27 January.
- Heidari, Z. 2016. Introduction to Formation Evaluation. Workshop given at the Geology and Geophysics Department of Texas A&M University, College Station, Texas, 27 January.
- Heidari, Z. 2015. Basics of Well Log Interpretation. Workshop given at the Geology and Geophysics Department of Texas A&M University, College Station, Texas, 11 February.

A.3. Invited Company Presentations, in Rank:

- Heidari, Z. 2017. Challenges with Formation Evaluation of Organic-Rich Mudrocks. Oral presentation at the Texas Oil and Gas institute, Houston, Texas, 2 June.
- Heidari, Z. 2016. An Introduction to Research Activities of the Multi-Scale Rock Physics Research Program at The University of Texas at Austin. Oral presentation at ConocoPhillips, Houston, Texas, 8 September.
- Heidari, Z. 2016. An Introduction to Research Activities of the Multi-Scale Rock Physics Research Program at The University of Texas at Austin. Oral presentation at Occidental Petroleum Corporation, Houston, Texas, 18 July.
- Heidari, Z. 2015. An Introduction to Research Activities of the Multi-Scale Rock Physics Research Program at The University of Texas at Austin. Oral presentation at BHP Billiton, Houston, Texas, 2 November and 3 December.

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- Heidari, Z. 2015. An Introduction to Research Activities of the Multi-Scale Rock Physics Research Program at The University of Texas at Austin. Oral presentation given to BP representatives at the College of Engineering, Austin, Texas, 22 October.
- Heidari, Z. 2014. Quantifying the Impact of Pyrite on Electrical Conductivity of Organic-rich Mudrocks. Oral presentation at ConocoPhillips, Houston, Texas, 10 December.
- Heidari, Z. 2014. Introduction and Progress Update on Research Activities of the Formation Evaluation Research Program at Texas A&M University. Oral presentation at ConocoPhillips, Houston, Texas, 1 October.
- Heidari, Z. 2014. Introduction and Progress Update on Research Activities of the Formation Evaluation Research Program at Texas A&M University. Oral presentation at Aramco Services Company, Houston, Texas, 4 April.
- Heidari, Z. 2014. An Update to Research Activities of the Formation Evaluation Research Program at Texas A&M University. Oral presentation at Chevron, Houston, Texas, 30 January.
- Heidari, Z. 2012. An Introduction to Research Activities of the Formation Evaluation Research Program at Texas A&M University. Oral presentation at Aramco Services Company, Houston, Texas, 11 December.
- Heidari, Z. 2012. An Introduction to Research Activities of the Formation Evaluation Research Program at Texas A&M University. Oral presentation at Halliburton, Houston, Texas, 5 April.
- Heidari, Z. 2012. An Introduction to Research Activities of the Formation Evaluation Research Program at Texas A&M University. Oral presentation at BP, Houston, Texas, 31 January.
- Heidari, Z. 2012. An Introduction to Research Activities of the Formation Evaluation Research Program at Texas A&M University. Oral presentation at Weatherford, Houston, Texas, 10 January.
- Heidari, Z. 2011. An Introduction to Research Activities of the Formation Evaluation Research Program at Texas A&M University. Oral presentation at Anadarko Petroleum Corporation, The Woodlands, Texas, 16 November.

A.4. Invited Company Presentations, before Rank:

- Heidari, Z. 2010. The Concept of Dynamic Petrophysics. Oral presentation at the Marathon Oil Company, Houston, Texas, 6 August.

B. Topical Conferences, Webinars, and Meetings**B.1. Topical Conferences, Webinars, and Meetings, in Rank:**

- Heidari, Z. 2016. Electrical Properties of Organic-Rich Mudrocks. Oral presentation at the SPWLA Resistivity Special Interest Group (Rt-SIG) Meeting, Society of Petrophysicists and Well Log Analysts (SPWLA), Houston, Texas, 20 October. (Invited)
- Heidari, Z., Aderibigbe*, A., and Valdes*, C. C. 2016. Completion-Oriented Rock Classification in Organic-Rich Mudrocks. Oral presentation at the Unconventional Resources Special Interest Group (URSIG) Meeting, Society of Petrophysicists and Well Log Analysts (SPWLA), Houston, Texas, 8 September. (Invited)
- Garcia*, A. P. and Heidari, Z. 2016. Quantification of Directional Pore Network Connectivity and Rock Fabric and its Application to Improve in-situ Assessment of Hydrocarbon Reserves and Directional Permeability. Oral presentation at the CPGE 2016 Research Showcase in Petroleum and Geosystems Engineering, Austin, Texas, 6 September.
- Valdes*, C. C. and Heidari, Z. 2016. Stress Prediction in Organic-Rich Mudrocks and its Applications in Completion Design. Oral presentation at the Schlumberger Doll-Research Center, Cambridge, Massachusetts, 8 July. (Invited)
- Valdes*, C. C. and Heidari, Z. 2016. Impact of Anisotropic Elastic and Petrophysical Properties on Stress Prediction in Organic-Rich Mudrocks. Oral presentation at Texas Tech University, Lubbock, Texas, 4 April. (Invited)

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- Heidari, Z. and Yang*, A., 2016. Graphitization and Aromaticity of Mature Kerogen and its Impact on Electrical Conductivity of Organic-Rich Mudrocks. Oral presentation at the 2016 Houston Geological Society (HGS) Applied Geoscience Conference (AGC), Houston, Texas, 8 March. (Invited)
- Valdes*, C. C., Aderibigbe*, A., and Heidari, Z. 2015. Impact of Anisotropic Elastic and Petrophysical Properties on Well-Log-Based Stress Prediction in Organic-Rich Mudrocks. Oral presentation at the SPWLA Completion Petrophysics Workshop, Society of Petrophysicists and Well Log Analysts (SPWLA), Houston, Texas, 12 November. (Invited)
- Aderibigbe, A., Cheng, K., Heidari, Z., Killough, J., and Fuss, T. 2015. Application of Magnetic Nanoparticles mixed with Propping Agents in Enhancing Near-Wellbore Fracture Detection. Poster presentation at the SPWLA Completion Petrophysics Workshop, Society of Petrophysicists and Well Log Analysts (SPWLA), Houston, Texas, 12 November. (Invited)
- Aderibigbe*, A., Valdes*, C. C., Heidari, Z., and Fuss, T. 2015. Mechanical Damage Characterization in Proppant Packs Using Acoustic Measurements. Oral presentation at the SPWLA Completion Petrophysics Workshop, Society of Petrophysicists and Well Log Analysts (SPWLA), Houston, Texas, 12 November. (Invited)
- Heidari, Z., Yang*, A., Chen*, H., and Firdaus*, G. 2015. Electrical Properties of Organic-rich Mudrocks. Oral presentation at the SEG 2015 Post-convention Workshop W-10 "Physics of Rocks", Society of Exploration Geophysicists (SEG), New Orleans, Louisiana, 23 October. (Invited)
- Heidari, Z. 2015. An Introduction to the Multi-Scale Rock Physics Research Program at The University of Texas at Austin. Oral presentation at EAC meeting, The University of Texas at Austin, Austin, Texas, 16 October.
- Chen*, H. and Heidari, Z. 2015. Impact of Water Salinity on High-Frequency Dielectric Measurements in Rock-Fluid Mixtures. Oral presentation at the SPWLA Dallas Chapter, Society of Petrophysicists and Well Log Analysts (SPWLA), Dallas, Texas, 10 September. (Invited)
- Heidari, Z. 2015. Hydrocarbon Reserves Evaluation in Organic-Rich Mudrocks. Oral presentation at the CPGE Annual Meeting, Department of Petroleum and Geosystems Engineering, The University of Texas at Austin, Austin, Texas, 8 September.
- Heidari, Z., Firdaus*, G., and Yang*, A. 2015. An Experimental Approach to Investigate the Impact of Thermal Maturity on Electrical Conductivity of Kerogen in Organic-Rich Mudrocks. Oral presentation at the Unconventional Resources Special Interest Group (URSIG) Meeting, Society of Petrophysicists and Well Log Analysts (SPWLA), The Woodlands, Texas, 24 August. (Invited)
- Heidari, Z. 2015. Research plans for experimental rock physics and new interpretation methods. Oral presentation at the 15th Annual Formation Evaluation Research Consortium Meeting, Department of Petroleum and Geosystems Engineering, The University of Texas at Austin, Austin, Texas, 18 September.
- Heidari, Z. 2015. Annual report for the Joint Industry Research Program (JIP) on "Multi-Scale Formation Evaluation of Unconventional and Carbonate Reservoirs". Oral presentation at Texas A&M University, College Station, Texas, 4 – 5 June.
- Valdes*, C. C., Aderibigbe*, A., Aranibar*, A., and Heidari, Z. 2015. Determination of Anisotropic Poroelasticity in the Haynesville Shale from Well-Log-Based Estimates. Poster presentation at the 2015 HGS Applied Geoscience Conference (AGC), Houston, Texas, 18 May. (Invited)
- Chi*, L. and Heidari, Z. 2015. New Method for Permeability Assessment using NMR Measurements. Oral presentation at the SPWLA Downtown Houston Chapter, Society of Petrophysicists and Well Log Analysts (SPWLA), Houston, Texas, 14 January. (Invited)
- Cheng*, K., Aderibigbe*, A., Alfi, M., Heidari, Z., and Killough, J. 2014. Application of Contrasting Nanoparticle Agents in Formation Evaluation. Oral presentation at SPWLA Resistivity Special Interest Group (SIG) Meeting, Houston, Texas, 22 October. (Invited)
- Heidari, Z. 2014. Improved Subsurface Hydrocarbon Estimation in Organic-Rich Source Rocks using Well Logs. Oral presentation at the SPE Webinar, Society of Petroleum Engineers (SPE), 8 October. (Invited)
- Heidari, Z. 2014. Electrical Properties of Organic-Rich Mudrocks. Oral presentation at the Berg-Hughes Symposium, Texas A&M University, 26 September.

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- *Aranibar*, A., Chen*, C., Saneifar*, M., and Heidari, Z.* 2014. Well-Log-Based Assessment of Elastic Properties and Rock Classification in Organic-Shale Formations. Oral presentation at the Pittsburgh Association of Petroleum Geologists meeting, Pittsburgh, Pennsylvania, 16 September. (Invited)
- *Heidari, Z. and Chen*, H.* 2014. Impact of Anisotropic Nature of Organic-Rich Source Rocks on Electrical Resistivity Measurements. Oral presentation at the Unconventional Resources Special Interest Group (URSIG) Meeting, Society of Petrophysicists and Well Log Analysts (SPWLA), The Woodlands, Texas, 7 August. (Invited)
- *Heidari, Z., Kotb**, A., and Chen*, H.* 2014. Upscaling of Electrical Resistivity Measurements in Porous Media. Oral presentation at the SEG/SPE/AAPG/SPWLA/EAGE Summer Research Workshop, San Diego, California, 3 – 8 August. (Invited)
- *Heidari, Z.* 2014. Annual report for the Joint Industry Research Program (JIP) on “Multi-Scale Formation Evaluation of Unconventional and Carbonate Reservoirs”. Oral presentation at Texas A&M University, College Station, Texas, 14 May.
- *Heidari, Z.* 2013. Quantifying the Impact of Concentration and Spatial Distribution of Pyrite and Kerogen on Estimates of Hydrocarbon Saturation from Well Logs. Oral presentation at the William C. Gussow Geoscience Conference on “Importance of Rock Properties in Unconventional Reservoirs,” Canadian Society of Petroleum Geologists, Banff, Canada, 16 October. (Invited)
- *Heidari, Z.* 2013. Interpretation of Electrical Properties in Organic-Rich Source Rocks for Reliable Petrophysical Evaluation. Oral presentation at the SEG Workshop on “Integration of Petrophysics, Rock Physics, and Laboratory Measurements,” Society of Exploration Geologists (SEG) 83rd Annual Conference and Exhibition, Houston, Texas, 27 September. (Invited)
- *Saneifar*, M. and Heidari, Z.* 2013. Permeability Assessment in Carbonate Formations Using Conventional Well Logs. Oral presentation at the SPWLA Dallas Chapter, Society of Petrophysicists and Well Log Analysts (SPWLA), Dallas, Texas, 12 September. (Invited)
- *Heidari, Z.* 2013. Improved Subsurface Hydrocarbon Estimation in Organic-Rich Source Rocks using Well Logs. Oral presentation at the SPE Webinar, Society of Petroleum Engineers (SPE), 19 June. (Invited)
- *Heidari, Z.* 2013. Annual report for the Joint Industry Research Program (JIP) on “Multi-Scale Formation Evaluation of Unconventional and Carbonate Reservoirs”. Oral presentation at Texas A&M University, College Station, Texas, 20 May.
- *Heidari, Z., Torres-Verdin, C., and Preeg, W. E.* 2012. Quantitative Method for Petrophysical and Compositional Evaluation of Organic-Shale Formations. Oral presentation at the SPWLA Dallas Chapter, Society of Petrophysicists and Well Log Analysts (SPWLA), Dallas, Texas, 10 May. (Invited)
- *Heidari, Z., Torres-Verdin, C., Adiguna, H., and Preeg, W. E.* 2011. New Deterministic Strategies for Petrophysical and Compositional Evaluation of Multi-Layer Formations with Thin Beds and Complex Lithology, and Exposed to Mud-Filtrate Invasion. Oral presentation at the SPWLA Fall Topical Conference, Society of Petrophysicists and Well Log Analysts (SPWLA), Asheville, North Carolina, 9 – 12 October.

B.2. Topical Conferences, Webinars, and Meetings, before Rank:

- *Heidari, Z., Marouby, P., Popielski, A., and Torres-Verdin, C.* 2011. Shale-Gas Evaluation with Conventional Well Logs Using Enhanced Lithology Assessment, Petrophysical and Elastic properties, and Rock Typing. Oral presentation at the Unconventional Resources SIG Meeting, Society of Petrophysicists and Well Log Analysts (SPWLA), The Woodlands, Texas, 27 July.
- *Heidari, Z., Torres-Verdin, C., and Preeg, W. E.* 2010. Mineral Concentrations from Conventional Logs. Oral presentation at the SPWLA Spring Topical Conference, “Unconventional Gas Petrophysics”, Society of Petrophysicists and Well Log Analysts (SPWLA), Austin, Texas, 25 – 29 April.

PATENTS:

- *Heidari, Z., et al.*, Design and implementation of a stiffness measurement device for diagnosing ACL deficiencies during Arthroscopy, Iran Patent no. 41577, June 2007.

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SOFTWARE DEVELOPED:

- A nonlinear multi-mineral solver based on joint inversion of borehole geophysical measurements (2007 – 2011).
- Numerical simulators developed in my research team (2011 – 2017) for modeling electrical current flow, fluid flow, nanoparticle flow, and NMR magnetization decay in fractured porous media, and for estimating NMR T_1 , T_2 , and diffusion coefficient, effective multi-frequency complex dielectric permittivity, and electrical conductivity.

FUNDED GRANTS AND CONTRACTS (In rank):

Total \$9,490,449. My Share **\$3,414,305**⁵ (\$2,282,113⁶ as the PI, \$1,132,192 as a Co-PI) Funded Research

+ **\$2,313,638** research funds under consideration/negotiation/review

+ \$12,000,000 W. D. Von Gonten Rock Physics Laboratory (Initial proposal preparation, Equipment selection and order, not counted in my research grants)

+ \$160,000 donation to purchase a pyrolysis equipment (it is already purchased) for my laboratory at UT Austin (not counted in my research grants)

- Integrated Formation Evaluation in South-central Delaware Basin and North-central Midland Basin Using Well Logs and Core Measurements, Texas Oil and Gas Institute, Zoya Heidari (PI), January 2017 – August 2017, \$98,910, Zoya Heidari (100%, \$98,910).
- Industrial Affiliate Research Program on “Multi-Scale Rock Physics for Unconventional and Carbonate Reservoirs,” Petroleum Industry (Current member: BP (paid for two years), negotiations are in progress with four other companies including Baker Hughes, Statoil, Halliburton, Wildcat Technologies, and Occidental Petroleum), Zoya Heidari (**Founder, director, and PI**), July 2016 – Present, \$50,000/year per company, Zoya Heidari (100%).
- Joint Industry Research Program on “Formation Evaluation, Petrophysics, and Reservoir Characterization for Unconventional and Carbonate Reservoirs,” Petroleum Industry (Aramco Services Company, BHP Billiton Petroleum, BP, Chevron, ConocoPhillips, and Devon Energy), Zoya Heidari (**Founder, director, and PI**), September 2012 – September 2015, \$900,000, Zoya Heidari (100%, \$900,000).
 - Rock Classification based on Petrophysical and Elastic Rock Properties Estimated from Well Logs
 - Quantifying the Effect of Kerogen and Pyrite on Electrical Resistivity and Dielectric Permittivity Measurements using Numerical Simulations and Laboratory Measurements
 - NMR Numerical Simulation, Measurement, and Interpretation in Organic-Rich Mudrocks and Carbonate Formations
 - Exploiting Unconventional Reservoir Characterization Techniques for Carbonate and Organic-Shale Reservoirs with Enhanced Logging
- Application of Acoustic Measurements for Quantifying Mechanical Damage in Propping Agents, Saint-Gobain Proppants, Zoya Heidari (PI), January 2015 – January 2017, \$100,000, Zoya Heidari (100%, \$100,000).
- A New Method to Characterize Pore-Structure, Mechanical Damage, and Conductivity of Proppant Packs using NMR Measurements, Saint-Gobain Proppants, Zoya Heidari (PI), January 2015 – January 2017, \$200,000.00, Zoya Heidari (100%, \$200,000).
- Advanced Magnetic Resonance Imaging Methodologies for 3-D analysis of Multiphase flow processes in Oil Reservoirs and Enhanced Oil Recovery (NPRP 7-1372-2-498), Qatar National Research Foundation, Grigorios Matenoglou (PI), Vassilios C. Kelessidis (Co-PI), Zoya Heidari (Co-PI), Georgios Papavassiliou (Co-PI), Thomas Maris (Co-PI), and Mario Costa Sousa (Co-PI), March 2015 – March 2018, \$897,111.06,

⁵ \$838,707 was terminated after I left Texas A&M University

⁶ \$50,000 of this amount is pending paperwork/invoice (BP, second year membership). I expect to receive the funds in my account in August 2017.

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Zoya Heidari (12.6%, \$113,484.98).

- Impact of Organic-Matter Spatial Connectivity on Electrical Properties of Organic-Rich Source Rocks, American Chemical Society, ACS PRF Doctoral New Investigator (DNI) Research Grant, Zoya Heidari (PI), September 2014 – September 2017, \$100,000, Zoya Heidari (100%, \$100,000).
- Improved Subsurface Hydrocarbon Estimation in Organic-Rich Source Rocks Using Combined Interpretation of Well Logs and Core Measurements, SPE Junior Faculty Research Initiation Fellowship, Zoya Heidari (PI), September 2012 – September 2014, \$40,000, Zoya Heidari (100%, \$40,000).
- Application of Nanoparticle Imaging in Quantifying Diagenesis Effects of Propping Agents, Saint-Gobain Proppants, Zoya Heidari (PI) and John Killough (Co-PI), January 2013 – January 2015, \$180,000, Zoya Heidari (75%, \$135,000).
- Optimizing Stimulation Treatments for PetroChina Tarim Oilfield Company, PetroChina Tarim Oilfield Company, D. A. Hill, Ding Zhu, Jiajing Lin, Yucel Akkutlu, and Zoya Heidari (Co-PI), September 2013 – September 2016, \$450,000, Zoya Heidari (20%, \$90,000).
- Acid Stimulation Research Program (ASRP), Petroleum Industry, Ding Zhu, D.A. Hill, Hisham Nasr-el-din, and Zoya Heidari (Co-PI), September 2012 – September 2015, \$1,800,000, Zoya Heidari (16.7%, \$300,000).

The projects I was responsible for:

- Petrophysical Rock Classification using Conventional Well Logs to Detect Zones for Acid Stimulation in Carbonate Reservoirs
- A Quantitative Application of Well Logs to Improve Prediction of Acid Stimulation in Carbonate Formations
- Advanced Computational and Numerical Modeling Techniques for Hydrocarbon Recovery (Proposal: 1401945), Skoltech Center for Research⁷, John Killough (PI), Zoya Heidari (Co-PI), Yucel Akkutlu, Berna Hascakir, Vivek Sarin, and Eduardo Gildin, January 2015 – January 2020, \$3,847,910, Zoya Heidari (15%, \$538,707). (My part was terminated after I left Texas A&M University)
- Enhanced In Situ Assessment of Petrophysical Properties and Kerogen Spatial Distribution in Organic-Rich Source Rocks using Well Logs, Crisman Institute, Zoya Heidari (PI), September 2013 – September 2016, \$313,259, Zoya Heidari (100%, \$313,259).
- Developing Enhanced Well Logging Methods for Fracture Characterization in Organic-Rich Source Rocks using Nanotechnology, Crisman Institute, Zoya Heidari (PI), John Killough (Co-PI), and Mark Everett (Co-PI), September 2013 – September 2016, \$313,259, Zoya Heidari (75%, \$234,944).
- Investigating and Quantifying the Effect of Petrophysical and Compositional Properties on Electrical Resistivity of Organic-Shale Formations to Improve Well-Log Interpretation Methods, Crisman Institute, Zoya Heidari (PI), September 2011 – September 2013, \$60,000, Zoya Heidari (100%, \$60,000).
- Quantifying Vertical Heterogeneity in Carbonate Formations using Well Logs for Improving Prediction of Acid Fracturing, Crisman Institute, D.A. Hill, Ding Zhu, Zoya Heidari (Co-PI), January 2012 – January 2015, \$90,000, Zoya Heidari (100%, \$90,000).
- Rock Physics Laboratory for Unconventional Resources, W. D. Von Gonten Laboratories, D.A. Hill, Zoya Heidari, and Yucel Akkutlu, November 2013, \$12,000,000.

Proposals under Consideration/Negotiation/Review: (\$2,313,638)

- My Industrial Affiliate Research Program on “Multi-Scale Rock Physics for Unconventional and Carbonate Reservoirs” is under consideration by (Statoil, Baker Hughes, Halliburton, and Occidental Petroleum): \$200,000 per year
- A proposal submitted to Saudi Aramco on “New In-Situ Reservoir Monitoring Method for Enhanced Hydrocarbon Recovery”: \$1,470,000
- A proposal submitted to Statoil (Norway) on “Enhanced Automatic Fracture Detection and Formation

⁷ This project was initiated in collaboration with other universities

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Evaluation using Automatic Joint Interpretation of Image logs and Conventional Well Logs”: \$200,000

- NSF CAREER Proposal on “Fundamental Investigation of Electromagnetic Properties of Rocks for Geophysical Characterization of Geothermal Systems”: \$443,638

CURRENT/ACCOMPLISHED RESEARCH PROJECTS (In Rank):

- Quantifying the Effects of Rock Fabric on Physical Properties (e.g., Electrical and Mechanical Properties) of Organic-Rich Mudrocks and Carbonates and Developing Interpretation Models assimilating Rock Fabric
- Develop New Methods for Real-Time and In-situ Assessment of Permeability Tensors
- Improving Interpretation of Dielectric Measurements in Formations with Complex Rock Physics including Organic-Rich Mudrocks and Carbonates through Numerical Simulations and Core-Scale Laboratory Measurements
- Model Development for Interpretation of Borehole Electrical Conductivity and Dielectric Measurements in Rocks with Challenging Rock Physics such as Organic-Rich Mudrocks and Carbonates (Pore-Scale Numerical Methods and Laboratory Experiments)
- Developing New Techniques for Application of Cuttings for Petrophysical Evaluation in Organic-Rich Mudrocks
- Evaluating Dynamic Petrophysical Properties of Tight Formations
- Developing New Methods for Assessment of Hydrocarbon Reserves in Organic-Rich Mudrocks
- Quantifying the Impact of Wettability on NMR and electrical Measurements using Laboratory Experiments and Numerical Simulations
- Reliable Interpretation of NMR Measurements in Unconventional Resources and Carbonates with Mixed Wettability and Complex Pore Geometry
- Improving Pore-Scale Numerical Simulation of NMR Measurements and their Interpretation in Organic-Rich Mudrocks
- Quantifying Physical Properties (e.g., electrical and mechanical properties) of Extracted Kerogen as a Function of Thermal Maturity
- Upscaling Pore-Scale NMR and Multi-Frequency Electrical Simulations to Core- and Log-Scale Measurements for improved Formation Evaluation of Spatially Heterogeneous Formation
- Quantifying Elastic Properties of Matrix Components and their Variability in Organic-Rich Mudrocks using Nano-indentation Technique
- New Methods for Real-Time Fluid Characterization
- Completion Petrophysics is one of the areas in which my research team has eagerly invested on and plan to expand. Some of their ongoing projects in the field of completion petrophysics are listed as follows:
 - Integrated Rock Classification in Organic-Rich Mudrocks for Detection of the Best Candidate Zones for Completion
 - Petrophysical Methods to Evaluate Proppants Performance in the Laboratory and in situ Condition (In collaboration with Saint-Gobain Proppants)
 - Diagnose and Investigate Reasons and Solutions for Water Production in Organic-Rich Mudrocks
 - Quantify Fracture Propagation in Organic-Rich Mudrocks
 - Quantify the Impact of Rock Fabric and Petrophysical Properties on Fracture Propagation
- Impact of Salinity on High-Frequency Dielectric Measurements of Rock-Fluid Mixtures
- Pore-Scale Evaluation of Dielectric Permittivity and Electrical Resistivity Measurements for Improved Assessment of Hydrocarbon Saturation

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- Thermal Maturation of Organic Matter and its Effects on Chemical and Electrical Properties of Organic-Rich Mudrocks
- Quantifying Petrophysical and Compositional Properties on Electrical Conductivity and Dielectric Permittivity of Organic-Rich Mudrocks
- Enhanced In-Situ Assessment of Petrophysical Properties and Kerogen Spatial Distribution in Organic-Rich Mudrocks using Well Logs
- New Methods for Assessment of Directional Permeability Tensor in Spatially Heterogeneous and Anisotropic Formations using Electrical and NMR Measurements
- Quantify the Impact of Natural Fractures on NMR measurements
- Improved Assessment of Pore-Size Distribution and Pore Connectivity in Multiple-Porosity Systems using Contrast Agents and NMR Relaxation Measurements
- Impact of Fracture-Pore Diffusional Coupling on NMR-Based Permeability Assessment in Complex Formations
- Pore Connectivity and Permeability Assessment in Complex Carbonate Formations Using NMR Log-Inject-Log Method
- Exploiting Unconventional Reservoir Characterization Techniques for Liquid-Rich Shale Reservoirs with Mobility-Enhanced Nanoparticle Logging
- Rock Classification in Organic-Rich Mudrocks and Carbonates
- Rock Classification Based on Anisotropic Stress Models for Optimization of Completion Design
- Multi-Scale Characterization of Pore Structure for Enhanced Rock Classification in Carbonate Formations
- Quantifying Vertical Heterogeneity in Carbonate Formations using Well Logs to Predict Water-Alternating-Gas Injectivity Loss
- Quantifying Uncertainty in Estimates of Elastic Properties of Rock Components and its Influence on Effective Elastic Properties in Organic-Rich Mudrocks
- Impact of Anisotropic Elastic and Petrophysical Properties on Stress Prediction in Organic-rich Mudrocks
- Application of Neutron Porosity Logs for Fracture Detection in the Presence of Injected Neutron-Absorbing Particles (in a research collaboration with the Texas A&M Nuclear Engineering Department)
- A New Method to Characterize Pore-Structure, Mechanical Damage, and Conductivity of Proppant Packs using NMR Measurements (In collaboration with Saint-Gobain Proppants)
- Detection of Propping Agents in Fractures using Well Logs Enhanced by Magnetic Nanoparticles (In collaboration with Saint-Gobain Proppants)
- Mechanical Damage Characterization in Proppant Packs using Acoustic Measurements (In collaboration with Saint-Gobain Proppants)
- A Quantitative Application of Well Logs to Improve Prediction of Acid Stimulation Performance in Carbonate Formations (In collaboration with Acid Stimulation Research Group at Texas A&M University)
- Deterministic Petrophysical Rock Classification in Carbonate Reservoirs using Conventional Well Logs to Detect Zones for Acid Stimulation (In collaboration with Acid Stimulation Research Group at Texas A&M University)
- Detection of Petrophysical Bed Boundaries and Petrophysical Evaluation Based on Well Logs and its Application to Carbonate and Organic-Rich Mudrocks

OTHER MAJOR RESEARCH ACTIVITIES:

- Collaborated in establishing a world-class Rock Physics Laboratory for Unconventional Resources at Texas A&M University (W. D. Von Gonten Laboratory). My contributions are listed as follows:
 - Prepared the first draft of the proposal for the laboratory in 2011 upon joining Texas A&M University

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- Contributed actively in expanding the initial proposal for W. D. Von Gonten Laboratories
- Selected up-to-date instruments for the laboratory and finalizing the quotes/orders
- Contributed actively in planning the laboratory set up
- Prepared test procedures for some equipment
- Established the Multi-Scale Formation Evaluation Research Program at Texas A&M University

COURSES TAUGHT:**Undergraduate Courses:**

- PGE337 (Unique Number: 19115), Introduction to Geostatistics (Spring 2017 semester)
Total enrollment: 56 students, Instructor Evaluation: 4.4/5, Course Evaluation: 4.0/5
- PGE337 (Unique Number: 19215), Introduction to Geostatistics (Spring 2016 semester)
Total enrollment: 58 students, Instructor Evaluation: 4.0/5, Course Evaluation: 3.7/5
- PETE321, Formation Evaluation, Sections 501 – 506 (Spring 2015 semester)
Total enrollment: 113 students, Evaluation: 4.17/5
- PETE321, Formation Evaluation, Sections 501 – 506 (Spring 2014 semester)
Total enrollment: 158 students, Evaluation: 4.04/5
- PETE321, Formation Evaluation, Sections 501 – 506 (Spring 2013 semester)
Total enrollment: 171 students, Evaluation: 4.22/5
- PETE321, Formation Evaluation, Sections 501 – 506 (Spring 2012 semester)
Total enrollment: 145 students, Evaluation: 3.43/5
- PETE311, Reservoir Petrophysics, Sections 501 – 503 (Fall 2011 semester)
Total enrollment: 45 students, Evaluation: 3.89/5

Graduate Courses:

- PGE385K (Unique Number: 19453), Advanced Multi-Well Formation Evaluation (Fall 2016 semester)
Total enrollment: 15 students, Instructor Evaluation: 4.4/5, Course Evaluation: 4.1/5
- PGE383 (Unique Number: 19334), Rock Physics (Fall 2015 semester)
Total enrollment: 8 students, Instructor Evaluation: 4.9/5, Course Evaluation: 4.6/5
- PETE608, Well Logging Methods, Section 600 (Fall 2014 semester)
Total enrollment: 39 students, Evaluation: 4.28/5
- PETE608, Well Logging Methods, Sections 600 and 700 (Fall 2013 semester)
Total enrollment: 42 students, Evaluation: 4.52/5 in on-campus group and 3.77/5 in distance learner group
- PETE608, Well Logging Methods, Section 600 (Fall 2012 semester)
Total enrollment: 23 students, Evaluation: 4.49/5

Graduate Seminar Series, Organized:

- PETE681 (Fall 2014)
- PETE681 (Spring 2014)
- PETE681 (Fall 2013)
- PETE681 (Spring 2013)
- PETE681 (Fall 2012)
- PETE681 (Spring 2012)

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Industry/University Short Courses:

- Advanced Formation Evaluation, July 2017, Petrobras Corporation.
- Well-log Interpretation Methods, January 27, 2017, Geology and Geophysics Department, Texas A&M University. (prepared the students to compete in the AAPG Imperial Barrel Award (IBA) Gulf Coast Regional competition, the Texas A&M team placed 3rd in the competition)
- Well-log Interpretation Methods, January 27, 2016, Geology and Geophysics Department, Texas A&M University. (prepared the students to compete in the AAPG Imperial Barrel Award (IBA) Gulf Coast Regional competition, the Texas A&M team placed 3rd in the competition)
- Well-log Interpretation Methods, February 11, 2015, Geology and Geophysics Department, Texas A&M University.
- Advanced Formation Evaluation and Well Logging Methods, February 3 – 6, 2015, Nigeria National Production Development Company.
- Formation Evaluation and Well Logging Methods, July 21 – 24, 2014, Nigeria National Production Development Company.
- Formation Evaluation and Well Logging Methods, July 22 – 24, 2013, Nigeria National Production Development Company.
- Formation Evaluation and Well Logging Methods, August 19 – 21, 2013, Nigerian National Petroleum Corporation.

ACADEMIC SUPERVISION:

Ph.D. Supervisions Completed:

1. Mehrnoosh Saneifar May 2015 Petroleum Engineering Texas A&M University
Dissertation: Application of Conventional Well Logs for Rock Classification to Enhance Characterization of Heterogeneity in Carbonate Formations
Comment: Joined BHP Billiton after graduation.
2. Lu Chi August 2015 Petroleum Engineering Texas A&M University
Dissertation: Interpretation of Nuclear Magnetic Resonance Measurements in Formations with Complex Pore Structure
Comment: Joined i-Rock Technologies after graduation.
3. Aderonke Aderibigbe May 2016 Petroleum Engineering Texas A&M University
Dissertation: Application of Petrophysical and Geophysical Analysis in Improvement of Completions Design in Organic-Rich Mudrock Formations
Comment: Joined BHP Billiton after graduation.
4. Huangye Chen May 2016 Petroleum Engineering Texas A&M University
Dissertation: Quantifying the Impact of Complex Pore and Grain Structures on Estimation of Hydrocarbon Saturation using Electrical Resistivity and Dielectric Permittivity Measurements
Comment: Joined Aramco Services Company after graduation.
5. Clotilde Chen Valdes August 2017 Interdisciplinary Engineering Texas A&M University
Dissertation: An Experimental Multi-Scale Assessment of Mechanical Properties of Organic-Rich Mudrocks
Comment: Clotilde defended in March 2017 and joined Shell. She will finalize her dissertation and graduate in August 2017. Dr. Robert Lytton served as a co-supervisor after I left Texas A&M University.

M.Sc. Supervision Completed:

1. Nikhil Kethireddy December 2013 Petroleum Engineering Texas A&M University

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Thesis: Quantifying the Effect of Kerogen on Electrical Resistivity Measurements in Organic-Rich Source Rocks

Comment: Joined Occidental Petroleum after graduation.

2. Alvaro Aranibar December 2014 Petroleum Engineering Texas A&M University
Thesis: Rock Classification in Organic-Rich Shale based on Petrophysical and Elastic Rock Properties Calculated from Well Logs
Comment: Joined PrimeEco Group after graduation.
3. Gama Firdaus August 2015 Petroleum Engineering Texas A&M University
Thesis: Laboratory Measurements of Electrical Conductivity of Kerogen in Organic-Rich Mudrocks
Comment: Continued Ph.D. at CSM
4. Emmanuel Oyewole December 2015 Petroleum Engineering Texas A&M University
Thesis: A New Method for Assessment of Directional Permeability in Carbonate Formations using Electrical Resistivity Measurements
Comment: Joined BHP Billiton after graduation.
5. Abdelrahman Kotb December 2015 Petroleum Engineering Texas A&M University
Thesis: Pore Network Connectivity and its Impact on Electrical Resistivity of Anisotropic Rocks with Complex pore Structure
Comment: Continued Ph.D. at TAMU.
6. Abdalla Ali December 2015 Petroleum Engineering Texas A&M University
Thesis: Evaluating the effects of Acid Stimulation Treatment Before and After Fines Migration on Petrophysical Properties in Sandstone Reservoirs

Comments: Switched to Master of Engineering after I left Texas A&M University and my role was changed from chair to co-chair of the committee. We published one conference paper and he had a defense on November 6, 2015.
Joined Wells Fargo after graduation.
7. Anqi Yang August 2016 Petroleum Engineering Texas A&M University
Thesis: Experimentally Quantifying the Impact of Thermal Maturity on Aromaticity and Density in Kerogen
Comments: Dr. Walter Ayers served as a co-supervisor after I left Texas A&M University.
Joined Matador Resources after graduation.
8. Shahin Amin May 2017 Petroleum Engineering Texas A&M University
Thesis: Integrated Rock Classification in Organic-Rich Mudrocks: A Case Study on Eagle Ford Formation
Comments: Dr. Walter Ayers served as a co-supervisor after I left Texas A&M University.
Joined Occidental Petroleum after graduation.

Ph.D. Students in Progress:**A. Students Passed the Written Ph.D. Qualifying Exams:**

- Kai Cheng, Texas A&M University (January 2013 – May 2018), Ph.D. Candidate
Comments: Dr. John Killough served as a co-supervisor after I left Texas A&M University.
Kai has already passed both the written and oral (proposal defense) Ph.D. qualifying exams.
- Saurabh Tandon, The University of Texas at Austin (September 2015 – August 2018), Ph.D. Candidate
Comments: Saurabh has already passed both the written and oral (proposal defense) Ph.D. qualifying exams.
- Artur Posenato Garcia, The University of Texas at Austin (January 2015 – December 2019)
Comments: Passed the written Ph.D. qualifying exams, will have his oral Ph.D. proposal defense in summer/Fall 2017.
- Archana Jagadisan, The University of Texas at Austin (September 2016 – August 2020)
Comment: Passed the written Ph.D. qualifying exams.

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B. Post M.Sc. Students Preparing to Take Ph.D. Qualifying Exam:

- Andres Gonzalez, The University of Texas at Austin (January 2017 – August 2022)
- Chelsea Newgord, The University of Texas at Austin (September 2017 – December 2022)

M.Sc. Students in Progress:

- Sonia Arumdati Purba, The University of Texas at Austin, Spring 2016 – Fall 2017
- Mohammed Al-Obaidi, The University of Texas at Austin, Fall 2016 – Summer 2018
- Naif M. Al-Rubaie, The University of Texas at Austin (co-supervised with Dr. Torres-Verdin), Fall 2016 – Summer 2018

Undergraduate Students Mentored:

- Nancy Zhou (Fall 2017 – Present)
- Barun Das, UT Austin (Summer 2017)
- Liem Tran, UT Austin (Spring 2017)
- Cheng (Laurel) He, UT Austin (Summer 2016 – Spring 2017)
- Maulik Sunil Shah, UT Austin (June 2016)
- Abdelrahman Kotb, Texas A&M University (Spring 2012 – Spring 2014)
- Abdalla Ali, Texas A&M University (Summer 2013)
- Marcus Elliott, Texas A&M University (Fall 2012 – Spring 2015)
- Shahin Amin, Texas A&M University (Summer 2014 – Spring 2015)

Supervision of Post-Doctoral, Visiting Scholars, and Research Fellows:

- Ameneh Rostami (Spring 2017 – Present)
- Nima Dabidian (Spring 2016 – Spring 2017)

Supervision of Distance Learner Students:

- Darren Doige, Texas A&M University (MEng, Fall 2013 – December 2016)
He switched to another advisor, after I left Texas A&M University.
- Daniel C. Westphal, Texas A&M University (MEng, Spring 2015 – Summer 2015)
He switched to another advisor, after I left Texas A&M University.

Committees:

- David Tang, Jackson School of Geosciences (Ph.D., Spring 2017 – Present)
- Azor Nwachukwu, Department of Petroleum and Geosystems Engineering (Ph.D., Spring 2017 – Present)
- Bishwas Ghimire, Department of Petroleum and Geosystems Engineering (Ph.D., Spring 2017 – Present)
- Mauro Palavecino, Department of Petroleum and Geosystems Engineering (M.Sc., Fall 2016)
- Mohammad Albusairi, Department of Petroleum and Geosystems Engineering (Ph.D., Fall 2016 – Present)

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- Juan Diego Escobar Gómez, Department of Petroleum and Geosystems Engineering (Ph.D., Fall 2015 – Summer 2017)
- Hyung Joo Lee, Department of Petroleum and Geosystems Engineering (Ph.D., Fall 2015 – Present)
- Mathilde Luyex, Department of Petroleum and Geosystems Engineering (Ph.D., Fall 2015 – Present)
- Rodolfo Victor, Department of Petroleum and Geosystems Engineering (Ph.D., Fall 2015 – Spring 2017)
- Joshua C. Bautista-Anguiano, Department of Petroleum and Geosystems Engineering (Ph.D., Fall 2015 – Present)
- Marwane Smaiti, Department of Petroleum and Geosystems Engineering (Ph.D., Fall 2015 – Present)
- Elsa Maalouf, Department of Petroleum and Geosystems Engineering (Ph.D., Fall 2015 – Present)
- Devri Agustianto, Geology and Geophysics Department (Ph.D., Fall 2015 – Present)
- Hewei Tang, Petroleum Engineering Department (M.Sc., Spring 2015 – Spring 2016)
- Qifei Huang, Geology and Geophysics Department (Ph.D., Fall 2012 – Spring 2017)
- Bronwyn Moore, Geology and Geophysics Department (M.Sc., Spring 2015 – Summer 2016)
- Xiaodong Zhang, Geology and Geophysics Department (M.Sc., Fall 2014 – Spring 2017)
- Mohammed Shammaa, Petroleum Engineering Department (M.Sc., Fall 2014 – Present)
- Ahmed Elsarawy, Petroleum Engineering Department (M.Sc., Fall 2014 – Fall 2015)
- Ahmed M Shehataahmedhussein, Petroleum Engineering Department (Ph.D., Fall 2014 – Spring 2016)
- Haider Al Abdulaal, Petroleum Engineering Department (M.Sc., Fall 2014 – Present)
- Zhuo Chen, Petroleum Engineering Department (Ph.D., Fall 2014 – Summer 2015)
- Qin Ji, Petroleum Engineering Department (Ph.D., Fall 2014 – Spring 2017)
- Matthew Wehner, Geology and Geophysics Department (Ph.D., Fall 2014 – Present)
- Jeffrey Zhang, Petroleum Engineering Department (As a substitute for Dr. Schubert) (M.Sc., Fall 2014)
- Sridhara Vallabhaneni, Geology and Geophysics Department (M.Sc., Fall 2014 – Spring 2016)
- Denis Zubarev, Petroleum Engineering Department (As a substitute for Dr. Lee at Preliminary exam) (Ph.D., Summer 2014)
- Sajjaat Muhemmed, Petroleum Engineering Department (M.Sc., Fall 2014 – Fall 2015)
- Shiwei Wu, Petroleum Engineering Department (M.Sc., Fall 2014 – Summer 2016)
- Alexis Ortega, Petroleum Engineering Department, (As a substitute for Dr. Schubert at Preliminary exam) (Ph.D., Summer 2014)
- Zhao Zhang, Geology and Geophysics Department (Ph.D., Spring 2014 – Spring 2015)
- Maaz I. Ali, Petroleum Engineering Department (M.Sc., Spring 2014 – Present)
- Miles Sasser, Geology and Geophysics Department (M.Sc., Spring 2014 – Fall 2015)
- Raul Gonzalez, Petroleum Engineering Department (Ph.D., Spring 2014 – Spring 2017)
- Guangjian (Cecilia) Xu, Geology and Geophysics (M.Sc., Spring 2014 – Present)

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Department

- Christopher Ulrich, Geology and Geophysics Department (M.Sc., Fall 2012 – Spring 2013)
- Liqin Sang, Geology and Geophysics Department (Ph.D., Fall 2013 – Spring 2016)
- Syed U. Farid, Petroleum Engineering Department (M.Sc., Fall 2013 – Spring 2015)
- Trey Lyon, Geology and Geophysics Department (M.Sc., Fall 2013 – Fall 2014)
- Anthony Giambalvo, Petroleum Engineering Department, Distance Learning Program (M.Sc., Fall 2013 – Present)
- Allen Li, Geology and Geophysics Department (M.Sc., Fall 2013 – Present)
- Jie He, Petroleum Engineering Department (Ph.D., Fall 2013 – Present)
- Alexander Verde, Petroleum Engineering Department (Ph.D., Summer 2013, As a substitute)
- Chunyang Lu, Petroleum Engineering Department (M.Sc., Summer 2013, As a substitute)
- Aris Pramudito, Geophysics Department (Ph.D., Spring 2013 – Present)
- Diego Palacios Serrano, Geology and Geophysics Department (Co-Chair) (M.Sc., Spring 2013 – Fall 2014)
- Sangseok Youn, Geology and Geophysics Department (M.Sc., Spring 2013 – Present)
- Roy A. Conte, Geology and Geophysics Department (M.Sc., Spring 2013 – Spring 2015)
- Robert Schelstrate, Geology and Geophysics Department (M.Sc., Spring 2013 – Summer 2014)
- Kelechi N. Agim, Petroleum Engineering Department (M.Sc., Fall 2012 – Spring 2015)
- Brandon Bush, Geology and Geophysics Department (M.Sc., Spring 2012 – Summer 2013)
- Hunter Bray, Geology and Geophysics Department (M.Sc., Spring 2012 – Spring 2013)
- Margaret Zoe Smoot, Geology and Geophysics Department (Ph.D., Spring 2012 – Summer 2015)
- Marcelo Fagundes De Rezende, Geology and Geophysics Department (Ph.D., Spring 2012 – Spring 2015)
- Jassim Almulla, Petroleum Engineering Department (Ph.D., Spring 2012, As a substitute)
- Yao Tian, Petroleum Engineering Department (Ph.D., Fall 2011 – Spring 2014)
- Travis James Barry, Geology and Geophysics Department (M.Sc., Fall 2011, As a substitute)

PROFESSIONAL SOCIETY AND MAJOR GOVERNMENTAL COMMITTEES:

- Society of Petroleum Engineers, Invited to serve as an **Associate Editor** for the SPE Reservoir Evaluation & Engineering Journal, invited, August 2017 – August 2020.
- Society of Petrophysicists and Well Log Analysts, Member of the **Publications Committee**, invited, July 2017 – Present.
- Society of Exploration Geologists (SEG) 87th Annual Conference and Exhibition, Served as a reviewer for papers submitted under Borehole Geophysics section, invited, April 2017.
- National Science Foundation (NSF), **Review Panelist** for the 2017 NSF Graduate Research Fellowship Program (GRFP), invited, January 23, 2017 and January 26, 2017.
- Society of Petrophysicists and Well Log Analysts, Member of the **Nomination Committee**, invited, September 2016 – May 2017.
- Society of Petrophysicists and Well Log Analysts, Member of the SPWLA Board of Directors as the **Vice President (VP) of Education**, nominated and elected, July 2016 – 2018. My contributions to Formation Evaluation education as the SPWLA VP Education are listed as follows:
 - Organize and host **monthly webinars** (currently total of 11 webinars)

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- Organize **training courses** related to Formation Evaluation
- Extend SPWLA's support to universities to educate graduate- and undergraduate-level students
- Initiate a new form of SPWLA **student paper contest**, including local- and international-level competitions
- Organize two **topical conferences** per year. The topical conferences organized so far include:
 - The Role of Petrophysics in Plugging and Abandonment, 2016, November 7 – 8, Houston, Texas.
 - Value of Information and Uncertainty in Petrophysics, 2017, April 19 – 21, Bogota, Colombia.
- Expand **modern and online education of Formation Evaluation** in the SPWLA community
- Society of Petrophysicists and Well Log Analysts, served as a judge for the annual international student paper contest, invited, June 26, 2016.
- Society of Petrophysicists and Well Log Analysts, Member of the **Steering Committee** for the Unconventional Resources Special Interest Group (URSIG), invited, September 2015 – Present.
- Society of Petrophysicists and Well Log Analysts, Member of the Steering Committee for the SPWLA Topical Conference on “**Completion Petrophysics**,” invited, held on October 19 – 20, 2015.
- Society of Petroleum Engineers, Member of the **Steering Committee** for Unconventional Reserves Task Force Summit, invited, March 2015 – December 2015.
 - Served as the representative of the Society of Petrophysicists and Well Log Analysts (SPWLA) on the steering committee for the Unconventional Reservoirs Task Force
 - Served as discussion leader in Session 2 on Petrophysics in the event held on 18 – 19 August, 2015, Houston, TX
- Society of Petroleum Engineers, Technical reviewer for the **SPE Young Faculty Research Award proposals**, invited, Spring 2015.
- American Chemical Society, Technical reviewer for **ACS-PRF proposals**, invited, July 2014 and 2016.
- Society of Petrophysicists and Well Log Analysts, Member of the **Education Committee**, invited, September 2014 – Present.
- Society of Engineering Science (SES) Conference, **Member of the Local Organizing Committee**, invited, September 2014 – October 2015.
- Society of Petrophysicists and Well Log Analysts, Member of the **Steering Committee** for SPWLA Topical Conference on “**Educating the Petrophysicist**,” invited, March 23 – 27, 2014. My duties as a member of the steering committee are listed as follows:
 - Schedule the event
 - Plan the conference content
 - Invite speakers
 - Review applications and select speakers & participants
 - Serve as session co-chairs during technical sessions and small group discussion facilitators during discussion periods
- Society of Petrophysicists and Well Log Analysts, Member of the **Technology Committee** for SPWLA Annual Symposium, invited, July 2013 – July 2016. My duties as a member of SPWLA technology committee are listed as follows:
 - Ranked the abstracts submitted for the annual symposium
 - Participated in making decisions about the technical program
 - Assisted with the planning of the technical workshops
 - Prepared proposals for technical workshops
 - Chaired technical sessions

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- Ranked the technical papers for selection of the best paper and poster at the symposium
- Unconventional Resources Conference (URTeC), Served as the co-chair in the “Formation Evaluation of Unconventional Reservoirs” session, invited, August 13, 2013.
- Society of Exploration Geologists (SEG) 83rd Annual Conference and Exhibition, Served as the chair in the “Advances in Borehole Measurements and Interpretation” session, invited, September 24, 2013.
- Served as a **Technical Reviewer** for the following journals:
 - Geophysics Journal (invited, January 2014 – Present)
 - SEG Interpretation Journal (invited, January 2014 – Present)
 - SPE Reservoir Evaluation & Engineering Journal (volunteered, January 2013 – Present)
 - SPE Production and Operations Journal (volunteered, January 2013 – Present)
 - Petrophysics Journal (invited, January 2013 – Present)
 - Journal of Mathematical Geosciences (invited, Summer 2012 – Present)
- Served as Webmaster for the SPWLA Austin Chapter, January 2008 – January 2010.

UNIVERSITY COMMITTEE ASSIGNMENTS:**Departmental:**

The University of Texas at Austin, Department of Petroleum and Geosystems Engineering:

- | | |
|---|---------------------------------|
| • Chair, Petrophysics Ph.D. Qualifying Exam Committee | September 2016 – February 2017 |
| • Member, Writing Ph.D. Qualifying Exam Committee | September 2016 – February 2017 |
| • Member, Graduate Admissions Committee | September 2016 – September 2017 |
| • Member, Faculty Search Committee | September 2015 – September 2016 |
| • Member, Graduate Committee | September 2015 – September 2016 |

Texas A&M University, The Harold Vance Department of Petroleum Engineering:

- | | |
|--|------------------------------|
| • Member, Undergraduate Admissions Committee | September 2014 – August 2015 |
| • Chair, Faculty Excellence Award Committee | Spring 2014 – August 2015 |
| • Member, Graduate Fellowship Committee | December 2012 – May 2015 |
| • Member, Crisman Committee | Spring 2015 |
| • Member, Awards Committee | September 2012 – August 2014 |
| • Member, Graduate Admissions Committee | September 2012 – August 2014 |
| • Member, Faculty Excellence Award Committee | Spring 2012 – August 2015 |

College:

The University of Texas at Austin, Cockrell School of Engineering:

- | | |
|--|--------------------------|
| • Member, Women in Engineering Committee | September 2015 – Present |
|--|--------------------------|

University:

Texas A&M University:

- | | |
|---|------------------------------|
| • Member, Junior Faculty Advisory Committee | September 2014 – August 2015 |
|---|------------------------------|

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- Member, Campus Security Authority

July 2012 – August 2015

Student Organizations:*Texas A&M University:*

- Faculty Advisor, Society of Petrophysicists and Well-Log Analysts (SPWLA) Student Chapter (Helped graduate and undergraduate students to initiate the SPWLA TAMU Student Chapter at Texas A&M University.)

Fall 2012 – December 2015

COMMUNITY SERVICES:

- The University of Texas at Austin, Served as a judge for the Ben Caudle Simple Concepts Contest, Department of Petroleum and Geosystems Engineering, Invited, February 2017.
- The University of Texas at Austin, Served as a host for a webinar on “Shale Fracturing: The Geology And Technology That Sustained The Boom,” Center for Petroleum & Geosystems Engineering, Department of Petroleum and Geosystems Engineering, appointed, February 19, 2016.
- The University of Texas at Austin, Served as a judge for the Ben Caudle Simple Concepts Contest, Department of Petroleum and Geosystems Engineering, Invited, December 2015.
- The University of Texas at Austin, Served as a judge for the CPGE student poster contest, Department of Petroleum and Geosystems Engineering, appointed, September 2015.
- Texas A&M University, Moderator for the student paper contest at the Harold Vance Department of Petroleum Engineering, volunteered, February 7, 2015.
- Texas A&M University, Expanding Your Horizons (EYH) program, **Encouraging Girls to Pursue Energy-Related STEM Careers**, held a workshop on rock physics and energy entitled “Symphony of Rocks and Fluids in the Subsurface” for about 45 6th-grade girls, volunteered, December 6, 2014.

I contributed to this program by holding a workshop on “Symphony of Rocks and Fluids in the Subsurface.” In this workshop, I introduced girls (in the level of 5th-8th grade) to rock physics, well logging, petrophysics, and formation evaluation by conducting simple experiments.

- Texas A&M University, Accompanied the graduate and undergraduate students for a field trip, Camp Reveille at Duncan, Oklahoma, volunteered, January 5 – 10, 2014.
- Texas A&M University, Moderator for the student paper contest at the Harold Vance Department of Petroleum Engineering, volunteered, January 25, 2014.
- The University of Texas at Austin, Girl Talk Event (Collaborated with the GirlTalk team from the University of Texas at Austin), **Encouraging Girls to Pursue Energy-Related STEM Careers**, held a workshop on rock physics and energy for more than 30 middle-school girls, volunteered, Spring 2013.

Collaborated with the GirlTalk team in the University of Texas at Austin. GirlTalk is a co-sponsored (CPGE and SFERE) formal outreach program on STEM topics in energy. The program encourages girls who exhibit an aptitude and desire to investigate careers in science, technology, engineering and math through interacting with career professionals. I contributed to this program by having a workshop on “Symphony of Rocks and Fluids in the Subsurface.” In this workshop, I introduced girls (in the level of 5th-8th grade) to rock physics, well logging, petrophysics, and formation evaluation by conducting simple experiments.

- Texas A&M University, Accompanied the graduate students from Petroleum Engineering and Geology and Geophysics departments of Texas A&M University, The University of Texas at Austin, and Rice University for a field trip, Eagle Ford formation, Texas, volunteered, March 2013.
- Texas A&M University, Moderator for the student paper contest at the Harold Vance Department of Petroleum Engineering, volunteered, January 26 and February 2, 2013.
- Texas A&M University, Moderator for the student paper contest at the Harold Vance Department of Petroleum Engineering, volunteered, January 28, 2012.

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CONTINUING AND PROFESSIONAL EDUCATION:

- New Faculty Breakfast CSE Business Affairs, Cockrell School of Engineering, The University of Texas at Austin, Austin, Texas, 1 April, 2016.
- NSF CAREER Preparation, Cockrell School of Engineering, The University of Texas at Austin, Austin, Texas, 24 February, 2016.
- Using Canvas to Deliver Make-Up Lectures, Cockrell School of Engineering, The University of Texas at Austin, Austin, Texas, 15 January, 2016.
- CIS Discussion with Karron Lewis, Cockrell School of Engineering, The University of Texas at Austin, Austin, Texas, 8 December, 2015.
- Office of Technology Commercialization, Cockrell School of Engineering, The University of Texas at Austin, Austin, Texas, 9 October, 2015.
- College of Education Symposium, Local and Global Perspectives on Shifting the Peer Observation Paradigm, The University of Texas at Austin, Austin, Texas, 9 December, 2015.
- Insider's Guide to NSF Workshop/Luncheon, The University of Texas at Austin, Austin, Texas, 11 November, 2015.
- Faculty Innovation Showcase, The University of Texas at Austin, Austin, Texas, 6 November, 2015.
- A workshop on "A Glance to Applied Geostatistics", Presented by Reinaldo J. Gonzalez and Jeffrey M. Yarus, SPWLA Annual Technical Conference and Exhibition, Long Beach, California, July 17, 2015.
- SPWLA Topical Conference on "Completion Petrophysics", Society of Petrophysicists and Well Log Analysts, November 12 – 13, 2015.
- The CIRTLL Program Overview Seminar, Texas A&M University, March 31, 2014.
- SPWLA Topical Conference on "Educating the Petrophysicist", Society of Petrophysicists and Well Log Analysts, March 23 – 27, 2014.
- New Faculty Institute: An Institute and learning community for new tenure-track assistant professors, Center for Teaching Excellence, June 18 – 20, 2013.
- Kick Start Your Teaching: Effectiveness and Efficiency Workshop, April 17, 2013.
- High-Impact Practices Building Synergies into your Teaching, Faculty Teaching Academy (FTA) seminar, March 22, 2013.
- Stress Free Writing Workshop, October 3, 2012.
- Roadmap for a Successful Academic Career Workshop, March 26 – 28, 2012.
- Demystifying the Tenure and Promotion Process, March 9, 2012.
- The CAREER and Other Young Investigator Programs Seminar, March 5, 2012.
- A short course on "Shale Petrophysical Evaluation", SPWLA Annual Technical Conference and Exhibition, Colorado Springs, Colorado, May 14 – 19, 2011.
- A workshop on "Writing Winning Grants", Presented by David C. Morrison, Grant Writers' Seminars and Workshops, Austin, Texas, October 30, 2009.
- A short course on "Clay Minerals and Their Effect on the Electrical Behavior of Shaly Sands", Presented by E. C. Thomas, SPWLA Annual Technical Conference and Exhibition, The Woodlands, Texas, June 21 – 24, 2009.
- A workshop on "Horizontal Well Path Planning and Geosteering Fundamentals", Presented by Edward Stockhausen, SPWLA Topical Conference, Taos, New Mexico, March 30, 2008.

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VITA:

Zoya Heidari is an assistant professor in the Department of Petroleum and Geosystems Engineering at The University of Texas at Austin. Before joining The University of Texas at Austin, she was an assistant professor at Texas A&M University in College Station and the Chevron Corporation faculty fellow in Petroleum Engineering from September 2011 to August 2015. Zoya has been the founder and the director of the Texas A&M Joint Industry Research Program on “Multi-Scale Formation Evaluation of Unconventional and Carbonate Reservoirs” from 2012 to 2015 and The University of Texas at Austin Industrial Affiliate Research Program on “Multi-Scale Rock Physics” starting 2016. She received a Ph.D. (2011) in petroleum engineering from The University of Texas at Austin. Zoya is one of the recipients of the 2017 SPE (Society of Petroleum Engineers) Cedric K. Ferguson Medal, the 2016 SPE regional Formation Evaluation award (from the Southwest North America Region and the Gulf Coast North America Region), the 2014 TEES (Texas A&M Engineering Experiment Station) Select Young Faculty Fellows award from the College of Engineering at Texas A&M University, and the 2012 SPE Petroleum Engineering Junior Faculty Research Initiation Award. She was also one of the recipients of the 2015 SPE Innovative Teaching Award. Zoya has supervised 22 graduate students since 2011. She has published 34 articles in refereed technical journals and over 70 articles in international conferences. Her research interests include Petrophysics, Borehole Geophysics, Well Logging, Formation Evaluation, Rock Physics, Underground Water Resources, Inverse Problems, Integrated Reservoir Characterization of Carbonates and Unconventional Resources, and Completion Petrophysics. Zoya has served on technical committees for the SPWLA annual symposium, the SPWLA education committee, the local organizing committee of the Society of Engineering Science (SES) conference, and the SPWLA Unconventional Resources Special Interest Group (URSIG), and steering committees for SPWLA topical conferences on “Completion Petrophysics” and “Educating the Petrophysicist” as well as unconventional reserves task force summit. She has served as an associate editor for the SPE Reservoir Evaluation & Engineering Journal. Zoya is currently serving as Vice President of Education for SPWLA.

Candidate's Summary of Activities

(in rank for assistant professor; since last promotion for associate professors)

ZOYA HEIDARI

Metric	Value
Peer-reviewed journal publications (in rank and total)	30 / 34
Peer-reviewed conference proceedings (in rank and total)	59 / 70
Number of journal papers in rank with supervised student(s) from UT as co-author	15 with my students (TAMU and UT) after I joined UT, total of 23 with my students in rank
Total citations of all publications (career) from ISI Web of Knowledge	55
h-index (career) from ISI Web of Knowledge	4
Total citations of all publications (career) from Google Scholar or Publish or Perish	349
h-index (career) from Google Scholar or Publish or Perish	11
Total external research funding raised in rank	\$9,490,449
Total external research funding raised in rank (candidate's share)	\$3,414,305
Total number of external grants/contracts awarded in rank	16
Number of external grants/contracts awarded in rank as PI	11 (9 single PI, 2 with Co-PIs)
PhD students completed†	4.5 (4 sole advisor)
MS students completed†	6.5 (5 sole advisor)
PhD students in pipeline (as of 09/2017) †	5.5 (5 sole advisor)
MS students in pipeline (as of 09/2017) †	2.5 (2 sole advisor)
Number of courses taught	12 (TAMU: 8, UT: 4)
Total number of students taught in organized courses	873 (736 TAMU, 137 UT)
Average instructor evaluation for UG courses	UT: 4.2/5, TAMU: 3.95/5
Average instructor evaluation for Grad courses	UT: 4.65/5, TAMU: 4.43/5
Average course evaluation for UG courses	UT: 3.85/5, TAMU: N/A
Average course evaluation for Grad courses	UT: 4.35/5, TAMU: N/A
Number of teaching awards	1
Student organizations advised	1 (Society of Petrophysicists and Well-Log Analysts Student Chapter, TAMU)
Undergraduate researchers supervised	8
Service on journal editorial boards	1 (Associate editor for 1 journal, technical reviewer for 6 journals)
Number of symposia organized	2 Topical conferences for SPWLA as the VP-Education, 13 webinars for SPWLA, 4 annual meetings for my industrial affiliates research program, member of steering committee for 5 topical conferences, special technical events, ...

† Count a student as 1.0 if sole supervisor and 0.5 if co-supervised.

Complete Reverse Chronological List of Publications and Scholarly/Creative Works
Zoya Heidari

Title of Dissertation: Estimation of Static and Dynamic Petrophysical Properties from Well Logs in Multi-Layer Formations

Dissertation Advisor: Dr. Carlos Torres-Verdin

Note: *, **, and *** in this document indicate graduate students, undergraduate students, and postdoctoral researchers/visiting scholars under my supervision, respectively.

A. Refereed Archival Journal Papers:

Section A.1. Works published (or in an equivalent status), in press, accepted, or under contract while in current rank at UT Austin.

34. An, C., Yan, B., Alfi, M., Mi, L., Killough, J., and Heidari, Z. 2017. Accepted for Publication. Estimating Spatial Distribution of Natural Fractures by Changing NMR T2 Relaxation with Magnetic Nanoparticles. *Journal of Petroleum Science and Engineering* (submitted December 2016, accepted for publication July 17, 2017).
 - Co-authors: Cheng An, Ph.D. Student, Texas A&M University; Masoud Alfi, Ph.D. Student, Texas A&M University; Lidong Mi, Ph.D. Student, Texas A&M University; John Killough, Professor at Texas A&M University
 - Qualitative statement of contribution: Cheng, Masoud, and Lidong were graduate student under Dr. Killough's supervision. I served on some of their dissertation committees when I was at Texas A&M University. The project was part of a previously funded proposal by me and Dr. Killough (I was the first PI). I contributed to defining the project (use of contrast agents to enhance NMR measurements as well as other well logs) and the NMR- and nanoparticle-related parts of the project. Dr. Killough was responsible for the reservoir modeling part of the project.
33. Jagadisan*, A., Yang*, A., Heidari, Z. 2017. Accepted for Publication. An Experimental Approach to Quantify the Impact of Kerogen Maturity on its Chemical Aromaticity and Electrical Conductivity. *Petrophysics* (submitted November 2016, accepted for publication July 27, 2017).
 - Co-authors: Archana Jagadisan, Ph.D. Student, UT Austin; Angie Yang, M.Sc. Student, Texas A&M University
 - Qualitative statement of contribution: Archana is a Ph.D. student under my supervision and Angie was a M.Sc. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
32. Valdes*, C. C., H. and Heidari, Z. 2017. *Accepted for Publication*. Application of Nanoindentation for Uncertainty Assessment of Elastic Properties in Mudrocks at Micro-scale and Well-log

Domains. *Geophysics* (submitted October 2016, accepted for publication June 2017). Anticipated publication date: December 2017.

- Co-authors: Clotilde Chen Valdes, Ph.D. Student, Texas A&M University
- Qualitative statement of contribution: Clotilde was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

31. Chen*, H. and Heidari, Z. 2017. *Accepted for Publication*. Effect of Water Salinity and Water-Filled Pore Volume on High-Frequency Dielectric Measurements in Porous Media. *SPE Reservoir Evaluation & Engineering Journal, Formation Evaluation* (submitted October 2016, accepted for publication March 6, 2017). Anticipated publication date: December 2017.

- Co-authors: Huangye Chen, Ph.D. Student, Texas A&M University
- Qualitative statement of contribution: Huangye was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

30. Tang, H., Killough, J., Heidari, Z., and Sun, Z. 2017. (Published Online, April 2017). A New Technique To Characterize Fracture Density by Use of Neutron Porosity Logs Enhanced by Electrically Transported Contrast Agents. *SPE Journal* (submitted August 2016, accepted for publication January 13, 2017). DOI: 10.2118/181509-PA

- Co-authors: Hewei Tang, Ph.D. Student, Texas A&M University; John Killough, Professor at Texas A&M University; Zhuang Sun, Ph.D. Student at UT Austin
- Qualitative statement of contribution: Hewei was a M.Sc. student under Dr. Killough's supervision. I served as a member of her thesis committee. I worked closely with Hewei for numerical modeling of neutron porosity measurements. The project was part of a previously funded proposal by Dr. Killough and me (I was the first PI). I contributed to defining the project (use of contrast agents which can enhance neutron logs). Dr. Killough was responsible for the reservoir modeling part of the project. I also contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

29. Cheng*, K. and Heidari, Z. 2017. Combined Interpretation of NMR and TGA Measurements to Quantify the Impact of Relative Humidity on Hydration of Clay Minerals. *Applied Clay Science Journal* **143**: 362 – 371. DOI: 10.1016/j.clay.2017.04.006

- Co-authors: Kai Cheng, Ph.D. Student, Texas A&M University (He has been working in my laboratories at UT Austin since January 2016)
- Qualitative statement of contribution: Kai is a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

28. Cheng*, K. and Heidari, Z. 2017. (Published Online, May 2017). Pore-Network Connectivity and Permeability Assessment by Use of Nuclear Magnetic Resonance Log-Inject-Log Method. *SPE Reservoir Evaluation & Engineering Journal, Formation Evaluation*. DOI: 10.2118/175066-PA
 - Co-authors: Kai Cheng, Ph.D. Student, Texas A&M University (He has been working in my laboratories at UT Austin since January 2016)
 - Qualitative statement of contribution: Kai is a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
27. Saneifar*, M., Heidari, Z., Linroth, M., and Purba*, S. A. 2017. Effect of Heterogeneity on Fluid Injectivity Loss during Water-Alternating-Gas Injection in the Scurry Area Canyon Reef Operators Committee Unit. *SPE Reservoir Evaluation & Engineering Journal, Formation Evaluation* **20** (2): 293 – 303. DOI: 10.2118/175064-PA
 - Co-authors: Mehrnoosh Saneifar, Ph.D. Student, Texas A&M University; Mark Linroth, Industry collaborator from Kinder Morgan, Sonia Arumdati Purba, M.Sc. Student, UT Austin
 - Qualitative statement of contribution: Mehrnoosh was a Ph.D. student under my supervision. Sonia is a M.Sc. student under my supervision. Mark's contribution included providing information about the data that we applied our method to (the data used in this work was provided by Kinder Morgan). This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
26. Valdes*, C. C., Aderibigbe*, A., and Heidari, Z. 2016. Impact of Anisotropic Porelastic Parameters Estimated using Well Logs and Core Measurements on Stress Prediction in Organic-Rich Mudrocks. *Interpretation* **4** (3): T359 – T372. DOI: 10.1190/INT-2015-0122.1
 - Co-authors: Clotilde Chen Valdes, Ph.D. Student, Texas A&M University; Aderonke Aderibigbe, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Clotilde and Aderonke were Ph.D. students under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
25. Yang*, A., Firdaus*, G., and Heidari, Z. 2016. Electrical Resistivity and Chemical Properties of Kerogen Isolated from Organic-Rich Mudrocks. *Geophysics* **81** (6): D643 – D655. DOI: 10.1190/geo2016-0071.1
 - Co-authors: Anqi Yang, M.Sc. Student, Texas A&M University; Gama Firdaus, M.Sc. Student, Texas A&M University
 - Qualitative statement of contribution: Anqi and Gama were both M.Sc. students under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

24. Aderibigbe*, A., Valdes*, C. C., and Heidari, Z. 2016. Integrated Rock Classification in the Wolfcamp Shale based on Reservoir Quality and Anisotropic Stress Profile Estimated from Well Logs. *Interpretation* **4** (2): SF1 – SF18. DOI: 10.1190/INT-2015-0138.1
 - Co-authors: Clotilde Chen Valdes, Ph.D. Student, Texas A&M University; Aderonke Aderibigbe, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Clotilde and Aderonke were Ph.D. students under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
23. Aderibigbe*, A., Chen Valdes*, C., Heidari, Z., and Fuss-Dezelic, T. 2016. Mechanical-Damage Characterization in Proppant Packs by Use of Acoustic Measurements. *SPE Production & Operations Journal* **32** (2): 168 – 176. DOI: 10.2118/181763-PA
 - Co-authors: Clotilde Chen Valdes, Ph.D. Student, Texas A&M University; Aderonke Aderibigbe, Ph.D. Student, Texas A&M University; Tihana Fuss-Dezelic, Industry collaborator from Saint-Gobain Proppants
 - Qualitative statement of contribution: Clotilde and Aderonke were Ph.D. students under my supervision. Tihana's contribution included providing information about the proppants that we applied our method to (the proppants were provided by Saint-Gobain Proppants). This work was performed under my supervision. I defined the project (one of my proposals funded by Saint-Gobain Proppants), contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
22. Chen*, H. and Heidari, Z. 2016. Pore-Scale Joint Evaluation of Dielectric Permittivity and Electrical Resistivity for Assessment of Hydrocarbon Saturation Using Numerical Simulations. *SPE Journal* **21** (6): 1930 – 1942. DOI: 10.2118/170973-PA
 - Co-authors: Huangye Chen, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Huangye was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
21. Aderibigbe*, A., Cheng*, K., Heidari, Z., Killough, J., and Fuss-Dezelic, T. 2016. Application of Magnetic Nanoparticles mixed with Propping Agents in Enhancing Near-Wellbore Fracture Detection. *Journal of Petroleum Science and Engineering* **141**: 133 – 143.
 - Co-authors: Aderonke Aderibigbe, Ph.D. Student, Texas A&M University; Kai Cheng, Ph.D. Student, Texas A&M University; John Killough, Professor at Texas A&M University; Tihana Fuss-Dezelic, Saint-Gobain Proppants
 - Qualitative statement of contribution: Kai is Ph.D. students under my supervision. Aderonke is a former Ph.D. student under my supervision. The project was part of a previously funded proposal by Dr. Killough and me (I was the first PI). Dr. Killough helped Kai in modeling nanoparticle flow in fractured media. Tihana's contribution included providing information about the proppants that we applied our method to (the proppants were provided by Saint-Gobain Proppants). I was mainly responsible for the experimental work and the near wellbore

detection techniques. I contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

20. Chi*, L. and Heidari, Z. 2016. Directional-Permeability Assessment in Formations with Complex Pore Geometry With a New Nuclear-Magnetic-Resonance-Based Permeability Model. *SPE Journal* **21** (4): 1436 – 1449. DOI: 10.2118/179734-PA

- Co-authors: Lu Chi, Ph.D. Student, Texas A&M University
- Qualitative statement of contribution: Lu was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

19. Oyewole*, E., Saneifar*, M., and Heidari, Z. 2016. Multiscale Characterization of Pore Structure in Carbonate Formations: Application to the Scurry Area Canyon Reef Operators Committee Unit. *Interpretation* **4** (2): T157 – T169. DOI: 10.1190/INT-2015-0123.1

- Co-authors: Emmanuel Oyewole, M.Sc. Student, Texas A&M University; Mehrnoosh Saneifar, Ph.D. Student, Texas A&M University
- Qualitative statement of contribution: Emmanuel was a M.Sc. student under my supervision. Mehrnoosh was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

18. Chi*, L., Cheng*, K., and Heidari, Z. 2016. Improved Assessment of Interconnected Porosity in Multiple-Porosity Rocks by Use of Nanoparticle Contrast Agents and Nuclear-Magnetic-Resonance Relaxation Measurements. *SPE Reservoir Evaluation & Engineering Journal, Formation Evaluation* **19** (1): 95 – 107. DOI: 10.2118/170792-PA

- Co-authors: Lu Chi, Ph.D. Student, Texas A&M University; Kai Cheng, Ph.D. Student, Texas A&M University
- Qualitative statement of contribution: Lu is a former Ph.D. student under my supervision. Kai is Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

Section A.2. Works published (or in equivalent status) while in current rank at other institutions (if applicable)

17. Chen*, H. and Heidari, Z. 2016. Quantifying the Directional Connectivity of Rock Constituents and its Impact on Electrical Resistivity of Organic-Rich Mudrocks. *Mathematical Geosciences* **48** (3): 285 – 303. DOI: 10.1007/s11004-015-9595-9

- Co-authors: Huangye Chen, Ph.D. Student, Texas A&M University
- Qualitative statement of contribution: Huangye was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the

development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

16. Saneifar*, M., Conte, R., Valdes, C. C., Heidari, Z., and Pope, M. C. 2015. Integrated Rock Classification in Carbonate Formations Based on Elastic and Petrophysical Properties Estimated from Conventional Well Logs. *AAPG Bulletin* **99** (7): 1261 – 1280. DOI: 10.1306/02091514167
 - Co-authors: Mehrnoosh Saneifar, Ph.D. Student, Texas A&M University; Roy Conte, Ph.D. Student, Texas A&M University; Clotilde Chen Valdes, Ph.D. Student, Texas A&M University; Michael Pope, Professor at Texas A&M University (Department of Geology and Geophysics)
 - Qualitative statement of contribution: Mehrnoosh and Clotilde were Ph.D. students under my supervision. Roy was a Ph.D. student under Dr. Pope's supervision. Roy and Dr. Pope contributed to geological description of the formation and identifying geological facies. My team contributed to petrophysical classification and analysis of the data for assessment of petrophysical and mechanical properties. Clotilde contributed to laboratory experiments for measuring elastic properties of the rocks. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
15. Saneifar*, M., Heidari, Z., and Hill, A. D. 2015. Application of Conventional Well Logs to Characterize Spatial Heterogeneity in Carbonate Formations Required for Prediction of Acid-Fracture Conductivity. *SPE Production and Operations Journal* **30** (3): 243 – 256. DOI:10.2118/173183-PA
 - Co-authors: Mehrnoosh Saneifar, Ph.D. Student, Texas A&M University; Daniel Hill, Professor at Texas A&M University
 - Qualitative statement of contribution: Mehrnoosh was a Ph.D. student under my supervision. The part related to use of conventional well logs for characterizing spatial heterogeneity was led by me. Dr. Hill helped us in incorporating an analytical method in the paper for prediction of acid-fracture conductivity using the parameter estimated from well logs. I contributed to defining the project, the development of the research framework/solution, and the interpretation of results, and participated in manuscript drafting and revision.
14. Chi*, L. and Heidari, Z. 2015. Diffusional Coupling between Microfractures and Pore Structure and its Impact on Nuclear Magnetic Resonance Measurements in Multi-Porosity Systems. *Geophysics* **80** (1): D31 – D42. DOI: 10.1190/geo2013-0467.1
 - Co-authors: Lu Chi, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Lu was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
13. Saneifar*, M., Aranibar*, A., and Heidari, Z. 2015. Rock Classification in the Haynesville Shale Based on Petrophysical and Elastic Properties Estimated from Well Logs. *Interpretation* **3** (1): SA65 – SA75. DOI: 10.1190/INT-2013-0198.1

- Co-authors: Mehrnoosh Saneifar, Ph.D. Student, Texas A&M University; Alvaro Aranibar, M.Sc. Student, Texas A&M University
 - Qualitative statement of contribution: Mehrnoosh was a Ph.D. student under my supervision. Alvaro was a M.Sc. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
12. Chen*, H. and Heidari, Z. 2014. Pore-Scale Evaluation of Dielectric Measurements in Formations with Complex Pore and Grain Structures. *Petrophysics* **55** (6): 587 – 597.
- Co-authors: Huangye Chen, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Huangye was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
11. Cheng*, K., Aderibigbe*, A., Alfi, M., Heidari, Z., and Killough, J. 2014. Quantifying the Impact of Petrophysical Properties on Spatial Distribution of Contrasting Nanoparticle Agents in the New-Wellbore Region. *Petrophysics* **55** (5): 447 – 460.
- Co-authors: Kai Cheng, Ph.D. Student, Texas A&M University; Aderonke Aderibigbe, Ph.D. Student, Texas A&M University; Masoud Alfi, Ph.D. Student, Texas A&M University; John Killough, Professor at Texas A&M University
 - Qualitative statement of contribution: Kai is Ph.D. students under my supervision. Aderonke is a former Ph.D. student under my supervision. Masoud is a Ph.D. student under Dr. Killough's supervision. The project was part of a previously funded proposal by me and Dr. Killough (I was the first PI). Kai and Masoud worked on numerical modeling of nanoparticles in near-wellbore region under my and Dr. Killough's supervision. Kai synthesized the nanoparticles under my supervision. Aderonke performed experimental work under my supervision. I contributed to defining the project, the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
10. Kethireddy*, N., Chen*, H., and Heidari, Z. 2014. Quantifying the Effect of Kerogen on Resistivity Measurements in Organic-Rich Mudrocks. *Petrophysics* **55** (2): 136 – 146.
- Co-authors: Nikhil Kethireddy, Ph.D. Student, Texas A&M University; Huangye Chen, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Nikhil was a M.Sc. student under my supervision. Huangye was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
9. Heidari, Z. and Torres-Verdin, C. 2014. Inversion-Based Detection of Bed Boundaries for Petrophysical Evaluation with Well Logs: Applications to Carbonate and Organic-Shale Formations. *Interpretation* **2** (3): T129 – T142. DOI: 10.1190/INT-2013-0172.1

- Co-authors: Carlos Torres-Verdín, Professor at UT Austin
 - Qualitative statement of contribution: I started this project after I joined Texas A&M University as an assistant professor. This work is not part of my Ph.D. Dissertation. However, the developments in this project include some of the codes from my Ph.D. project. I defined the project, contributed to the development of the research framework/solution, computational codes, the derivation of results, and the interpretation of results, and prepared the manuscript.
8. Heidari, Z., Torres-Verdín, C., and Preeg, W. E. 2013. Improved Estimation of Mineral and Fluid Volumetric Concentrations in Thinly-Bedded Carbonate Formations. *Geophysics* **78** (4): D261 – D269. DOI: 10.1190/geo2012-0438.1
- Co-authors: Carlos Torres-Verdín, Professor at UT Austin; William Preeg, Consultant
 - Qualitative statement of contribution: I performed this project under the supervision of Dr. Carlos Torres-Verdín. I contributed to the development of the research framework/solution, computational codes, the derivation of results, and the interpretation of results, and prepared the manuscript.
7. Heidari, Z. and Torres-Verdín, C. 2013. Inversion-Based Method for Estimating Total Organic Carbon and Porosity and for Diagnosing Mineral Constituents from Multiple Well Logs in Shale-Gas Formations. *Interpretation* **1** (1): T113 – T123. DOI: 10.1190/INT-2013-0014.1
- Co-authors: Carlos Torres-Verdín, Professor at UT Austin
 - Qualitative statement of contribution: I performed this project under the supervision of Dr. Carlos Torres-Verdín. I contributed to the development of the development of the research framework/solution, computational codes, the derivation of results, and the interpretation of results, and prepared the manuscript. I completed this work after I left UT Austin.
6. Heidari, Z. and Torres-Verdín, C. 2012. Estimation of Dynamic Petrophysical Properties of Water-Bearing Sands Invaded with Oil-Base Mud from the Interpretation of Multiple Borehole Geophysical Measurements. *Geophysics* **77** (6): D209 – D227. DOI: 10.1190/geo2012-0006.1
- Co-authors: Carlos Torres-Verdín, Professor at UT Austin
 - Qualitative statement of contribution: I performed this project under the supervision of Dr. Carlos Torres-Verdín. I contributed to the development of the development of the research framework/solution, computational codes, the derivation of results, and the interpretation of results, and prepared the manuscript.
5. Heidari, Z., Torres-Verdín, C., and Preeg, W. E. 2012. Improved Estimation of Mineral and Fluid Volumetric Concentrations from Well Logs in Thinly-Bedded and Invaded Formations. *Geophysics* **77** (3): WA79 – WA98. DOI: 10.1190/geo2011-0454.1
- Co-authors: Carlos Torres-Verdín, Professor at UT Austin; William Preeg, Consultant
 - Qualitative statement of contribution: I performed this project under the supervision of Dr. Carlos Torres-Verdín. I contributed to the development of the research framework/solution, computational codes, the derivation of results, and the interpretation of results, and prepared the manuscript.

Section A.3. Works published (or in equivalent status) while in previous rank(s) at UT Austin (if applicable)

4. Heidari, Z., Torres-Verdín, C., Mendoza, A., and Wang, G. L. 2011. Assessment of Residual Hydrocarbon Saturation with the Combined Quantitative Interpretation of Resistivity and Nuclear Logs. *Petrophysics* **52** (3): 217 – 237.
 - Co-authors: Carlos Torres-Verdín, Professor at UT Austin; Alberto Mendoza, Ph.D. Student, UT Austin; Gong Li Wang, Postdoctoral Researcher, UT Austin
 - Qualitative statement of contribution: I performed this project under the supervision of Dr. Carlos Torres-Verdín. Alberto and Gong Li contributed to development of forward simulation codes for modeling of nuclear and resistivity logs, respectively. I contributed to the development of the research framework/solution, computational codes, the derivation of results, and the interpretation of results, and prepared the manuscript.
3. Heidari, Z., Farahmand, F., Arabalibeik, H., and Parnianpour, M. 2008. Adaptive Neuro-Fuzzy Inference System for Classification of ACL-Ruptured Knees Using Arthrometric Data. *Annals of Biomedical Engineering* **36** (9): 1449 – 1457. DOI: 10.1007/s10439-008-9532-x
 - Co-authors: Farzam Farahmand, Professor at Sharif University of Technology; Hamid Arabalibeik, Professor at Tehran University; Mohammad Parnianpour, Professor at Sharif University of Technology
 - Qualitative statement of contribution: I performed this project under the supervision of Dr. Farahmand. I contributed to the development of the research framework/solution, computational codes, the derivation of results, and the interpretation of results, and prepared the manuscript.
2. Vossoughi, G., Pendar, H., Heidari, Z., and Mohammadi, S. 2008. Assisted Passive Snake-Like Robots: Conception and Dynamic Modeling Using Gibbs-Appell Method. *Robotica* **26** (3): 267 – 276. DOI: 10.1017/S0263574707003864
 - Co-authors: Gholamreza Vossoughi, Professor at Sharif University of Technology; Hodjat Pendar, Ph.D. Student, Sharif University of Technology; Saman Mohammadi, Undergraduate Student, Sharif University of Technology
 - Qualitative statement of contribution: I performed this project (my undergraduate final project) under the supervision of Dr. Gholamreza Vossoughi. I contributed to the development of the research framework/solution, the derivation of the results, and collecting and interpreting the data, and participated in manuscript drafting.

Section A.4. Works published (or in equivalent status) while in previous rank(s) at other institutions (if applicable)

1. Basafa, E., Heidari, Z., Tamaddoni, H., Mirbageri, A., Haddad, O., and Parnianpour, M. 2007. The Effect of Fatigue on Recurrence Parameters of Postural Sway. *Journal of Biomechanics* **40**: S362. DOI: 10.1016/S0021-9290(07)70357-3

- Co-authors: Ehsan Basafa, M.Sc. Student, Sharif University of Technology; Hossein Tamaddoni, M.Sc. Student, Sharif University of Technology; Alireza Mirbagheri, Ph.D. Student, Sharif University of Technology; Omid Haddad, M.Sc. Student, Sharif University of Technology; Mohammad Parnianpour, Professor at Sharif University of Technology
- Qualitative statement of contribution: I contributed to the development of the research framework/solution, and collecting and interpreting the data, and participated in manuscript drafting.

B. Refereed Conference Proceedings:**Section B.1. Works published (or in an equivalent status), in press, accepted, or under contract while in current rank at UT Austin.**

70. Tandon*, S., Rostami***, A., and Heidari, Z. 2017. A New NMR-based Method for Wettability Assessment in Mixed-Wet Rocks. To be presented at the SPE Annual Technical Conference and Exhibition (ATCE), San Antonio, Texas, 9 – 11 October. SPE 187373.
 - Co-authors: Saurabh Tandon, Ph.D. Student, UT Austin; Ameneh Rostami, Visiting Scholar, UT Austin
 - Qualitative statement of contribution: Saurabh is a Ph.D. student under my supervision. Ameneh is a visiting scholar in my team, being trained under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
69. Garcia*, A. P., Jagadisan*, A., Rostami***, A., and Heidari, Z. 2017. A New Workflow for Improved Water Saturation Assessment in Organic-Rich Mudrocks Honoring Rock Fabric. To be presented at the Unconventional Resources Technology Conference (URTeC), Austin, Texas, 24 – 26 July.
 - Co-authors: Artur Posenato Garcia, Ph.D. Student, UT Austin; Archana Jagadisan, Ph.D. Student, UT Austin; Ameneh Rostami, Visiting Scholar, UT Austin
 - Qualitative statement of contribution: Artur and Archana are Ph.D. students under my supervision. Ameneh is a visiting scholar in my team, being trained under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
68. Tandon*, S., Heidari, Z., and Daigle, H. 2017. Pore-Scale Evaluation of Nuclear Magnetic Resonance Measurements in Organic-Rich Mudrocks Using Numerical Modeling. To be presented at the Unconventional Resources Technology Conference (URTeC), Austin, Texas, 24 – 26 July.
 - Co-authors: Saurabh Tandon, Ph.D. Student, UT Austin; Hugh Daigle, Assistant Professor at UT Austin
 - Qualitative statement of contribution: Saurabh is a Ph.D. student under my supervision. We consulted with Dr. Daigle about an experimental model, developed in his team, which we used in our numerical modeling. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
67. Garcia*, A. P., Jagadisan*, A., Rostami***, A., and Heidari, Z. 2017. A New Resistivity-based Model for Improved Hydrocarbon Saturation Assessment in Clay-Rich Formations using Quantitative Clay Network Geometry and Rock Fabric. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 58th Annual Symposium, Oklahoma City, Oklahoma, 17 – 21 June.

- Co-authors: Artur Posenato Garcia, Ph.D. Student, UT Austin; Archana Jagadisan, Ph.D. Student, UT Austin; Ameneh Rostami, Visiting Scholar, UT Austin
 - Qualitative statement of contribution: Artur and Archana are Ph.D. students under my supervision. Ameneh is a visiting scholar in my team, being trained under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
66. Cheng*, K. and Heidari, Z. 2017. A New Method for Quantifying Cation Exchange Capacity in Clay Minerals. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 58th Annual Symposium, Oklahoma City, Oklahoma, 17 – 21 June.
- Co-authors: Kai Cheng, Ph.D. Student, Texas A&M University (He has been working in my laboratories at UT Austin since January 2016)
 - Qualitative statement of contribution: Kai is a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
65. Purba*, S. A., Garcia*, A. P., and Heidari, Z. 2017. New Method for Rock Classification in Carbonate Formations using Well-Log-Based Rock Fabric Quantification. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 58th Annual Symposium, Oklahoma City, Oklahoma, 17 – 21 June.
- Co-authors: Sonia Arumdati Purba, M.Sc. Student, UT Austin; Artur Posenato Garcia, Ph.D. Student, UT Austin
 - Qualitative statement of contribution: Sonia is a M.Sc. student under my supervision. Artur is a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
64. Garcia*, A. P., Heidari, Z., and Rostami***, A. 2017. Improved Assessment of Hydrocarbon Saturation in Mixed-Wet Rocks with Complex Pore Structure. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 58th Annual Symposium, Oklahoma City, Oklahoma, 17 – 21 June.
- Co-authors: Artur Posenato Garcia, Ph.D. Student, UT Austin; Ameneh Rostami, Visiting Scholar, UT Austin
 - Qualitative statement of contribution: Artur is a Ph.D. student under my supervision. Ameneh is a visiting scholar in my team, being trained under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
63. Valdes*, C. C. and Heidari, Z., and Gonzalez*, A. 2017. Quantifying the Impacts of Thermal Maturity on Elastic Properties of Kerogen. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 58th Annual Symposium, Oklahoma City, Oklahoma, 17 – 21 June.

- Co-authors: Clotilde Chen Valdes, Ph.D. Student, Texas A&M University; Andres Gonzalez, Ph.D. Student, UT Austin
 - Qualitative statement of contribution: Clotilde and Andres are Ph.D. students under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
62. Tandon*, S. and Heidari, Z., and Matenoglou, G. 2017. Pore-Scale Numerical Modeling of Nuclear Magnetic Resonance Response in Rocks with Complex Pore Structure using Finite Volume Method. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 58th Annual Symposium, Oklahoma City, Oklahoma, 17 – 21 June.
- Co-authors: Saurabh Tandon, Ph.D. Student, UT Austin; Grigorios Matenoglou, Assistant Research Scientist, Texas A&M at Qatar
 - Qualitative statement of contribution: Saurabh is a Ph.D. student under my supervision. Grigorios is an assistant research scientist at TAMU Qatar, who prepared some micro-CT-scan images, used as inputs to our numerical modeling. This work was performed under my supervision as part of our QNRF project. I defined this part of the project (which is documented in this paper), contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
61. Jagadisan*, A. and Heidari, Z. 2017. Application of X-Ray Photoelectron Spectroscopy in Connecting Thermal Maturity of Kerogen to its Dielectric Constant in Organic-Rich Mudrocks. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 58th Annual Symposium, Oklahoma City, Oklahoma, 17 – 21 June.
- Co-authors: Archana Jagadisan, Ph.D. Student, UT Austin
 - Qualitative statement of contribution: Archana is a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
60. Purba*, S. A., Garcia*, A. P., and Heidari, Z. 2017. Improved Permeability Assessment using Directional Rock Fabric Quantification. Presented at the American Association of Petroleum Geologists (AAPG) Annual Convention & Exhibition, Houston, Texas, 2 – 5 April.
- Co-authors: Sonia Arumdati Purba, M.Sc. Student, UT Austin; Artur Posenato Garcia, Ph.D. Student, UT Austin
 - Qualitative statement of contribution: Sonia is a M.Sc. student under my supervision. Artur is a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
59. Matenoglou, G., Kelessidis, V. C., Garcia*, A. P., Heidari, Z., Fardis, M., Anastasiou, A., and Papavassiliou, G. 2016. Advanced NMR and MRI Methodologies for Wettability Characterization in Carbonate Reservoirs. Presented at the SPE International Petroleum Technology Conference, Bangkok, Thailand, 14 – 16 November. IPTC 18853.

- Co-authors: Artur Posenato Garcia, Ph.D. Student, UT Austin; Grigorios Matenoglou, Assistant Research Scientist, Texas A&M at Qatar; Vassilios Kelessidis, Professor, Texas A&M University at Qatar; M. Fardis, National Center for Scientific Research, Demokritos; A. Anastasiou, National Center for Scientific Research, Demokritos; Georgios Papavassiliou, National Center for Scientific Research, Demokritos
 - Qualitative statement of contribution: Artur is a Ph.D. student under my supervision. Artur and I contributed to the pore-scale numerical modeling, documented in this paper.
58. Garcia*, A. P. and Heidari, Z. 2016. Directional Pore Network Connectivity and Rock Fabric Characterization and its Application in Enhanced Assessment of Hydrocarbon Reserves. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Dubai, UAE, 26 – 28 September. SPE 181571.
- Co-authors: Artur Posenato Garcia, Ph.D. Student, UT Austin
 - Qualitative statement of contribution: Artur is a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
57. Tandon*, S. and Heidari, Z. 2016. Impact of Internal Magnetic Field Gradients on Nuclear Magnetic Resonance Measurements and NMR-based Pore Network Characterization. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Dubai, UAE, 26 – 28 September. SPE 181532.
- Co-authors: Saurabh Tandon, Ph.D. Student, UT Austin
 - Qualitative statement of contribution: Saurabh is a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
56. Tang, H., Killough, J., Heidari, Z., and Sun, Z., 2016. A New Technique to Characterize Fracture Density Using Neutron Porosity Logs Enhanced by Electrically-Transported Contrast Agents. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Dubai, UAE, 26 – 28 September. SPE 181509.
- Co-authors: Hewei Tang, Ph.D. Student, Texas A&M University; John Killough, Professor at Texas A&M University; Zhuang Sun, Ph.D. Student at UT Austin
 - Qualitative statement of contribution: Hewei was a M.Sc. student under Dr. Killough's supervision. I served as a member of her thesis committee. I worked closely with Hewei for numerical modeling of neutron porosity measurements. The project was part of a previously funded proposal by Dr. Killough and me (I was the first PI). I contributed to defining the project (use of contrast agents which can enhance neutron logs). Dr. Killough was responsible for the reservoir modeling part of the project. I also contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
55. Dabidian***, N., Heidari, Z., and Yang*, A. 2016. Quantifying the Impact of Thermal Maturity on Dielectric Permittivity of Pure Kerogen in Organic-Rich Mudrocks. Presented at the

Unconventional Resources Technology Conference (URTeC), San Antonio, Texas, 1 – 3 August. URTeC 2460670.

- Co-authors: Nima Dabidian, Postdoctoral Researcher, UT Austin; Anqi Yang, M.Sc. Student, Texas A&M University
 - Qualitative statement of contribution: Nima was a postdoctoral researcher under my supervision. Anqi was a M.Sc. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
54. Yang*, A. and Heidari, Z. 2016. An Experimental Approach to Quantify the Impact of Kerogen Maturity on its Chemical Aromaticity and Electrical Conductivity. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 57th Annual Symposium, Reykjavik, Iceland, 25 – 29 June.
- Co-authors: Anqi Yang, M.Sc. Student, Texas A&M University
 - Qualitative statement of contribution: Anqi was a M.Sc. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
53. Amin*, S., Wehner, M., Heidari, Z., and Tice, M. 2016. Rock Classification in the Eagle Ford Shale through Integration of Petrophysical, Geological, and Geochemical Characterization. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 57th Annual Symposium, Reykjavik, Iceland, 25 – 29 June.
- Co-authors: Shahin Amin, M.Sc. Student, Texas A&M University; Matthew Wehner, Ph.D. Student, Texas A&M University; Michel Tice, Associate Professor at Texas A&M University (Department of Geology and Geophysics)
 - Qualitative statement of contribution: Shahin was a M.Sc. student under my supervision. Matthew was a Ph.D. student under Dr. Tice's supervision. Matthew and Dr. Tice contributed to geological description of the formation and identifying geological facies. My team contributed to petrophysical classification and analysis of the data for assessment of petrophysical and mechanical properties. Shahin's thesis is on this topic. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
52. Yang*, A. and Heidari, Z. 2016. Experimental Quantification of the Impact of Thermal Maturity on Kerogen Density. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 57th Annual Symposium, Reykjavik, Iceland, 25 – 29 June.
- Co-authors: Anqi Yang, M.Sc. Student, Texas A&M University
 - Qualitative statement of contribution: Anqi was a M.Sc. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

51. Valdes*, C. C. and Heidari, Z. 2016. An Experimental Multi-Scale Approach for Assessment of Uncertainty in Elastic Properties of Organic-Rich Mudrocks. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 57th Annual Symposium, Reykjavik, Iceland, 25 – 29 June.
 - Co-authors: Clotilde Chen Valdes, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Clotilde was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
50. Cheng*, K. and Heidari, Z. 2016. An Experimental Approach to Quantify the Impact of Relative Humidity on Hydration of Clay Minerals Using NMR- and TGA- Based Evaluations. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 57th Annual Symposium, Reykjavik, Iceland, 25 – 29 June.
 - Co-authors: Kai Cheng, Ph.D. Student, Texas A&M University (He has been working in my laboratories at UT Austin since January 2016)
 - Qualitative statement of contribution: Kai is a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
49. Oyewole*, E., Garcia*, A. P., and Heidari, Z. 2016. A New Method for Assessment of Directional Permeability and Conducting Pore Network using Electric Conductance in Porous Media. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 57th Annual Symposium, Reykjavik, Iceland, 25 – 29 June.
 - Co-authors: Emmanuel Oyewole, M.Sc. Student, Texas A&M University; Artur Posenato Garcia, Ph.D. Student, UT Austin
 - Qualitative statement of contribution: Emmanuel was a M.Sc. student under my supervision. Artur is a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
48. Kotb*, A., Garcia*, A. P., and Heidari, Z. 2016. Multi-Scale Interpretation of Electrical Resistivity Measurements in the Presence of Complex Pore Structure and Anisotropy. Presented at the American Association of Petroleum Geologists (AAPG) Annual Convention & Exhibition, Calgary, Alberta, Canada, 19 – 22 June.
 - Co-authors: Abdelrahman Kotb, M.Sc. Student, Texas A&M University; Artur Posenato Garcia, Ph.D. Student, UT Austin
 - Qualitative statement of contribution: Abdelrahman was a M.Sc. student under my supervision. Artur is a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

47. Tandon*, S., Aderibigbe*, A., Heidari, Z., Shi, J., and Fuss, T. 2016. Proppant Damage Characterization using Nuclear Magnetic Resonance Measurements. Presented at the American Association of Petroleum Geologists (AAPG) Annual Convention & Exhibition, Calgary, Alberta, Canada, 19 – 22 June.
- Co-authors: Saurabh Tandon, Ph.D. Student, UT Austin; Aderonke Aderibigbe, Ph.D. Student, Texas A&M University; Jingyu Shi, Saint-Gobain Proppants; Tihana Fuss-Dezelic, Saint-Gobain Proppants
 - Qualitative statement of contribution: Saurabh is a former Ph.D. student under my supervision. Tihana's and Jingyu's contribution included providing information about the proppants that we applied our method to (the proppants were provided by Saint-Gobain Proppants). This work was performed under my supervision. I defined the project (one of my proposals funded by Saint-Gobain Proppants), contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
46. Garcia*, A. P. and Heidari, Z. 2016. A Streamline-based Approach for Evaluation of Electrical Tortuosity of Porous Media Using Electrical Conductivity. Presented at the InterPore 8th International Conference on Porous Media and Annual Meeting, Cincinnati, Ohio, 9 – 12 May. (This is not a full-length paper)
- Co-authors: Artur Posenato Garcia, Ph.D. Student, UT Austin
 - Qualitative statement of contribution: Artur is a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
45. Hanafy, A., Ali*, A., Nasr-el-Din, H. A., and Heidari, Z. 2015. Evaluating the Effects of Acid Stimulation Treatment Before and After Fines Migration on Petrophysical Properties in Sandstone Reservoirs. Presented at the SPE International Petroleum Technology Conference, Doha, Qatar, 6 – 9 December. IPTC 18569.
- Co-authors: Ahmed Hanafy, Ph.D. Student, Texas A&M University; Abdalla Ali, M.Sc. Student, Texas A&M University; Hisham Nasr-el-Din, Professor at Texas A&M University
 - Qualitative statement of contribution: Abdalla was a M.Sc. student co-supervised by Dr. Nasr-el-Din and I. Ahmed was supervised by Dr. Nasr-el-Din. Abdalla's main role was NMR measurements and interpretation under my supervision. I contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
44. Saneifar*, M., Heidari, Z., and Linroth, M. 2015. An Investigation on the Impact of Heterogeneity on Fluid Injectivity Loss during Water-Alternating-Gas Injection in Carbonate Formations. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Houston, Texas, 28 – 30 September. SPE 175064.
- Co-authors: Mehrnoosh Saneifar, Ph.D. Student, Texas A&M University; Mark Linroth, Kinder Morgan
 - Qualitative statement of contribution: Mehrnoosh was a Ph.D. student under my supervision. Mark's contribution included providing information about the data that we applied our method

to (the data used in this work was provided by Kinder Morgan). This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

43. Chi*, L., Heidari, Z., and Garcia, A. P. 2015. Investigation of Wettability and Fluid Distribution in Organic-rich Mudrocks using NMR Two-Phase Simulation. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Houston, Texas, 28 – 30 September. SPE 175077.

- Co-authors: Lu Chi, Ph.D. Student, Texas A&M University; Artur Posenato Garcia, Ph.D. Student, UT Austin (TAMU student at the time of the publication of this paper)
- Qualitative statement of contribution: Artur is a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

42. Firdaus*, G. and Heidari, Z. 2015. Quantifying Electrical Resistivity of Isolated Kerogen from Organic-Rich Mudrocks using Laboratory Experiments. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Houston, Texas, 28 – 30 September. SPE 175078.

- Co-authors: Gama Firdaus, M.Sc. Student, Texas A&M University
- Qualitative statement of contribution: Gama was a M.Sc. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

41. Cheng*, K. and Heidari, Z. 2015. Pore Connectivity and Permeability Assessment in Carbonate Formations using NMR Log-Inject-Log Method. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Houston, Texas, 28 – 30 September. SPE 175066.

- Co-authors: Kai Cheng, Ph.D. Student, Texas A&M University
- Qualitative statement of contribution: Kai is a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

40. Aderibigbe*, A., Amin**, S., Zeng, Z., Wehner, M., Xu, G., Maulana, I., Conte, R., Heidari, Z., Tice, M., and Laya, J. C. 2015. Integrated Rock Classification in the Eagle Ford Shale Formation Using Well Logs and Geological Evaluation. Presented at the AAPG/SEG/PESA 2015 International Conference & Exhibition, Melbourne, Australia, 13 – 16 September.

- Co-authors: Aderonke Aderibigbe, Ph.D. Student, Texas A&M University; Shahin Amin, M.Sc. Student, Texas A&M University; Matthew Wehner, Ph.D. Student, Texas A&M University; Michel Tice, Associate Professor at Texas A&M University (Department of Geology and Geophysics); Juan Carlos Laya, Associate Professor at Texas A&M University (Department of Geology and Geophysics); Roy Conte, Ph.D. Student, Texas A&M University (Department of Geology and Geophysics); Zhirui Zeng, Graduate Student, Texas A&M University (Department of Geology and Geophysics); Guangjian Xu, Graduate Student, Texas A&M

University (Department of Geology and Geophysics); Ivan Maulana, Graduate Student, Texas A&M University (Department of Geology and Geophysics)

- Qualitative statement of contribution: Aderonke was a Ph.D. student under my supervision. Shahin was a M.Sc. student under my supervision. Matthew, Zhirui, Guangjian, and Ivan were students under Dr. Tice's and Dr. Laya's supervision. Dr. Tice's and Dr. Laya's teams contributed to geological description of the formation and identifying geological facies. My team contributed to petrophysical classification and analysis of the data for assessment of petrophysical and mechanical properties. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

Section B.2. Works published (or in equivalent status) while in current rank at other institutions (if applicable)

39. Oyewole*, E., Saneifar*, M., and Heidari, Z. 2015. Multi-Scale Characterization of Pore Structure in Carbonate Formations: Application to the SACROC Unit. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 56th Annual Symposium, Long Beach, California, 18 – 22 July.
 - Co-authors: Emmanuel Oyewole, M.Sc. Student, Texas A&M University; Mehrnoosh Saneifar, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Emmanuel was a M.Sc. student under my supervision. Mehrnoosh was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
38. Chi*, L. and Heidari, Z. 2015. Impact of Fracture-Pore Diffusional Coupling on NMR-based Permeability Assessment. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 56th Annual Symposium, Long Beach, California, 18 – 22 July.
 - Co-authors: Lu Chi, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Lu was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
37. Valdes*, C. C., Aderibigbe*, A., and Heidari, Z. 2015. Impact of Anisotropic Elastic and Petrophysical Properties on Stress Prediction in Organic-Rich Mudrocks. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 56th Annual Symposium, Long Beach, California, 18 – 22 July.
 - Co-authors: Clotilde Chen Valdes, Ph.D. Student, Texas A&M University; Aderonke Aderibigbe, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Aderonke and Clotilde were Ph.D. students under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

36. Chen*, H. and Heidari, Z. 2015. Impact of Water Salinity on High-Frequency Dielectric Measurements in Rock-Fluid Mixtures. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 56th Annual Symposium, Long Beach, California, 18 – 22 July.
 - Co-authors: Huangye Chen, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Huangye was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
35. An, C., Alfi, M., Yan, B., Cheng*, K., Heidari, Z., and Killough, J. E. 2015. Modeling of Magnetic Nanoparticle Transport in Shale Reservoirs. Presented at the Society of Petroleum Engineers (SPE) Reservoir Simulation Symposium, Houston, Texas, 23 – 25 February. SPE 173282.
 - Co-authors: Cheng An, Ph.D. Student, Texas A&M University; Masoud Alfi, Ph.D. Student, Texas A&M University; Bicheng Yan, Ph.D. Student, Texas A&M University; Kai Cheng, Ph.D. Student, Texas A&M University; John Killough, Professor at Texas A&M University
 - Qualitative statement of contribution: Kai is a Ph.D. student under my supervision. Kai and I contributed to NMR studies of this project.
34. Aderibigbe*, A., Valdes*, C. C., Heidari, Z., and Fuss, T. 2014. Mechanical Damage Characterization in Proppant Packs Using Acoustic Measurements. Presented at the International Petroleum Technology Conference, Kuala Lumpur, Malaysia, 10 – 12 December. IPTC 18092.
 - Co-authors: Clotilde Chen Valdes, Ph.D. Student, Texas A&M University; Aderonke Aderibigbe, Ph.D. Student, Texas A&M University; Tihana Fuss, Saint-Gobain Proppants
 - Qualitative statement of contribution: Clotilde and Aderonke were Ph.D. students under my supervision. Tihana's contribution included providing information about the proppants that we applied our method to (the proppants were provided by Saint-Gobain Proppants). This work was performed under my supervision. I defined the project (one of my proposals funded by Saint-Gobain Proppants), contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
33. Aderibigbe*, A., Cheng*, K., Heidari, Z., Killough, J. E., Fuss, T., and Stephens, W. 2014. Detection of Propping Agents in Fractures using Magnetic Susceptibility Measurements Enhanced by Magnetic Nanoparticles. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Amsterdam, The Netherlands, 27 – 29 October. SPE 170818.
 - Co-authors: Aderonke Aderibigbe, Ph.D. Student, Texas A&M University; Kai Cheng, Ph.D. Student, Texas A&M University; John Killough, Professor at Texas A&M University; Tihana Fuss, Saint-Gobain Proppants; William Stephens, Saint-Gobain Proppants
 - Qualitative statement of contribution: Kai is Ph.D. students under my supervision. Aderonke is a former Ph.D. student under my supervision. The project was part of a previously funded proposal by Dr. Killough and me (I was the first PI). Dr. Killough helped Kai in modeling nanoparticle flow in fractured media. Tihana's and Tim's contribution included providing information about the proppants that we applied our method to (the proppants were provided by Saint-Gobain Proppants). I was mainly responsible for the experimental work and the near

wellbore detection techniques. I contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

32. Cheng*, K., Chi*, L., and Heidari, Z. 2014. Improved Assessment of Pore-Size Distribution and Pore Connectivity in Multiple-Porosity Systems using Superparamagnetic Iron Oxide Nanoparticles and NMR Measurements. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Amsterdam, The Netherlands, 27 – 29 October. SPE 170792.
 - Co-authors: Kai Cheng, Ph.D. Student, Texas A&M University; Lu Chi, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Kai and Lu were Ph.D. students under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
31. Chen*, H. and Heidari, Z. 2014. Assessment of Hydrocarbon Saturation in Organic-Rich Source Rocks using Combined Interpretation of Dielectric and Electrical Resistivity Measurements. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Amsterdam, The Netherlands, 27 – 29 October. SPE 170973.
 - Co-authors: Huangye Chen, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Huangye was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
30. Elliott**, M., Everett, M., and Heidari, Z. 2014. Modeling the Effects of Anomalous Electromagnetic Diffusion on Induction Logs: The Next Step in Mapping Natural Fracture Corridors. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), Amsterdam, The Netherlands, 27 – 29 October. SPE 170950.
 - Co-authors: Marcus Elliot, Undergraduate Student, Texas A&M University; Mark Everett, Professor at Texas A&M University (Department of Geology and Geophysics)
 - Qualitative statement of contribution: Marcus was a dual degree undergraduate student under my and Dr. Everett's supervision. I contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
29. Valdes*, C. C. and Heidari, Z. 2014. Experimental Assessment of Elastic Properties and Minimum Horizontal Stress in the Haynesville Shale-Gas Formation. Presented at the Unconventional Resources Technology Conference, Denver, Colorado, 25 – 27 August. URTeC 1922664.
 - Co-authors: Clotilde Chen Valdes, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Clotilde was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

28. Aranibar*, A., Valdes*, C. C. and Heidari, Z. 2014. Well-Log-Based Assessment of Elastic Properties in Organic-Shale Formations. Presented at the Unconventional Resources Technology Conference, Denver, Colorado, 25 – 27 August. URTEC 1922955.
 - Co-authors: Alvaro Aranibar, M.Sc. Student, Texas A&M University; Clotilde Chen Valdes, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Alvaro was a M.Sc. student under my supervision. Clotilde was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
27. Chi*, L., Elliott**, M., Heidari, Z., and Everett, M. 2014. Assessment of Micro-Fracture Density using Combined Interpretation of NMR Relaxometry and Electromagnetic Logs. Presented at the Unconventional Resources Technology Conference, Denver, Colorado, 25 – 27 August. URTEC 1922804.
 - Co-authors: Lu Chi, Ph.D. Student, Texas A&M University; Marcus Elliot, Undergraduate Student, Texas A&M University; Mark Everett, Professor at Texas A&M University (Department of Geology and Geophysics)
 - Qualitative statement of contribution: Lu was a Ph.D. student under my supervision. Marcus was a dual degree undergraduate student under my and Dr. Everett's supervision. Lu was responsible for NMR modeling under my supervision. Marcus was responsible for EM modeling under my and Dr. Everett's supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
26. Chen*, H. and Heidari, Z. 2014. Pore-Scale Evaluation of Dielectric Measurements in Formations with Complex Pore and Grain Structures. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 55th Annual Symposium, Abu Dhabi, United Arab Emirates, 18 – 22 May.
 - Co-authors: Huangye Chen, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Huangye was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
25. Chi*, L. and Heidari, Z. 2014. Directional Permeability Assessment in Formations with Complex Pore Geometry Using a New NMR-Based Permeability Model. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 55th Annual Symposium, Abu Dhabi, United Arab Emirates, 18 – 22 May.
 - Co-authors: Lu Chi, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Lu was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

24. Saneifar*, M., Conte, R., Chen, C., Heidari, Z., and Pope, M. C. 2014. Integrated Rock Classification in Carbonate Formations Based on Elastic and Petrophysical Properties Estimated from Conventional Well Logs. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 55th Annual Symposium, Abu Dhabi, United Arab Emirates, 18 – 22 May.
 - Co-authors: Mehrnoosh Saneifar, Ph.D. Student, Texas A&M University; Roy Conte, Ph.D. Student, Texas A&M University; Clotilde Chen Valdes, Ph.D. Student, Texas A&M University; Michael Pope, Professor at Texas A&M University (Department of Geology and Geophysics)
 - Qualitative statement of contribution: Mehrnoosh and Clotilde were Ph.D. students under my supervision. Roy was a Ph.D. student under Dr. Pope's supervision. Roy and Dr. Pope contributed to geological description of the formation and identifying geological facies. My team contributed to petrophysical classification and analysis of the data for assessment of petrophysical and mechanical properties. Clotilde contributed to laboratory experiments for measuring elastic properties of the rocks. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
23. Cheng*, K., Aderibigbe*, A., Alfi, M., Heidari, Z., and Killough, J. 2014. Quantifying the Impact of Petrophysical Properties on Spatial Distribution of Contrasting Nanoparticle Agents. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 55th Annual Symposium, Abu Dhabi, United Arab Emirates, 18 – 22 May.
 - Co-authors: Kai Cheng, Ph.D. Student, Texas A&M University; Aderonke Aderibigbe, Ph.D. Student, Texas A&M University; Masoud Alfi, Ph.D. Student, Texas A&M University; John Killough, Professor at Texas A&M University
 - Qualitative statement of contribution: Kai is Ph.D. students under my supervision. Aderonke is a former Ph.D. student under my supervision. Masoud is a Ph.D. student under Dr. Killough's supervision. The project was part of a previously funded proposal by me and Dr. Killough (I was the first PI). Kai and Masoud worked on numerical modeling of nanoparticles in near-wellbore region under my and Dr. Killough's supervision. Kai synthesized the nanoparticles under my supervision. Aderonke performed experimental work under my supervision. I contributed to defining the project, the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
22. Chen*, H., Firdaus*, G., and Heidari, Z. 2014. Impact of Anisotropic Nature of Organic-Rich Source Rocks on Electrical Resistivity Measurements. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 55th Annual Symposium, Abu Dhabi, United Arab Emirates, 18 – 22 May.
 - Co-authors: Huangye Chen, Ph.D. Student, Texas A&M University; Gama Firdaus, M.Sc. Student, Texas A&M University
 - Qualitative statement of contribution: Huangye was a Ph.D. student under my supervision. Gama was a M.Sc. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

21. Chi*, L. and Heidari, Z. 2014. Quantifying the Impact of Natural Fractures and Pore Structure on NMR Measurements in Multiple-Porosity Systems. Presented at the SPE International Petroleum Technology Conference, Doha, Qatar, 20 – 22 January. IPTC 17688.
 - Co-authors: Lu Chi, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Lu was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
20. Saneifar*, M., Aranibar*, A., and Heidari, Z. 2013. Rock Classification in the Haynesville Shale-Gas Formation Based on Petrophysical and Elastic Rock Properties Estimated from Well Logs. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), New Orleans, Louisiana, 30 September – 2 October. SPE 166328.
 - Co-authors: Mehrnoosh Saneifar, Ph.D. Student, Texas A&M University; Alvaro Aranibar, M.Sc. Student, Texas A&M University
 - Qualitative statement of contribution: Mehrnoosh was a Ph.D. student under my supervision. Alvaro was a M.Sc. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
19. Elliott**, M., Everett, M., and Heidari, Z. 2013. Forward Modeling of Induction Log Responses for Natural and Hydraulic Fractures. Presented at the 12th Scientific Assembly of International Association of Geomagnetism and Aeronomy (IAGA), Merida Yucatan, Mexico, 26 – 31 August. (This is not a full-length paper)
 - Co-authors: Marcus Elliot, Undergraduate Student, Texas A&M University; Mark Everett, Professor at Texas A&M University (Department of Geology and Geophysics)
 - Qualitative statement of contribution: Marcus was a dual degree undergraduate student under my and Dr. Everett's supervision. I contributed to the development of the research framework/solution and the interpretation of results.
18. Chen*, H., Kethireddy*, N., and Heidari, Z. 2013. Impact of Spatial Distribution of Kerogen Network on Electrical Resistivity of Organic-Rich Source Rocks. Presented at the Unconventional Resources Technology Conference, Denver, Colorado, 12 – 14 August. SPE 168923/ URTeC 1619806.
 - Co-authors: Huangye Chen, Ph.D. Student, Texas A&M University; Nikhil Kethireddy, M.Sc. Student, Texas A&M University
 - Qualitative statement of contribution: Huangye was a Ph.D. student under my supervision. Nikhil was a M.Sc. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.

17. Aranibar*, A., Saneifar*, M., and Heidari, Z. 2013. Petrophysical Rock Typing in Organic-Rich Source Rocks Using Well Logs. Presented at the Unconventional Resources Technology Conference, Denver, Colorado, 12 – 14 August. SPE 168913 / URTeC 1619574.
 - Co-authors: Mehrnoosh Saneifar, Ph.D. Student, Texas A&M University; Alvaro Aranibar, M.Sc. Student, Texas A&M University
 - Qualitative statement of contribution: Mehrnoosh was a Ph.D. student under my supervision. Alvaro was a M.Sc. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
16. Kethireddy*, N., Heidari, Z., and Chen*, H. 2013. Quantifying the Effect of Kerogen on Electrical Resistivity Measurements in Organic-Rich Source Rocks. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 54th Annual Symposium, New Orleans, Louisiana, 22 – 26 June.
 - Co-authors: Huangye Chen, Ph.D. Student, Texas A&M University; Nikhil Kethireddy, M.Sc. Student, Texas A&M University
 - Qualitative statement of contribution: Huangye was a Ph.D. student under my supervision. Nikhil was a M.Sc. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
15. Saneifar*, M. and Heidari, Z. 2013. Permeability Assessment in Carbonate Formations Using Conventional Well Logs Required for Prediction of Acid Fracture Conductivity. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 54th Annual Symposium, New Orleans, Louisiana, 22 – 26 June.
 - Co-authors: Mehrnoosh Saneifar, Ph.D. Student, Texas A&M University
 - Qualitative statement of contribution: Mehrnoosh was a Ph.D. student under my supervision. This work was performed under my supervision. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
14. Heidari, Z. and Torres-Verdín, C. 2012. Improved Detection of Bed Boundaries for Petrophysical Evaluation with Well Logs: Applications to Carbonate and Organic-Shale Formations. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), San Antonio, Texas, 8 – 10 October. SPE 159197.
 - Co-authors: Carlos Torres-Verdín, Professor at UT Austin
 - Qualitative statement of contribution: I started this project after I joined Texas A&M University as an assistant professor. This work is not part of my Ph.D. Dissertation. However, the developments in this project include some of the codes from my Ph.D. project. I defined the project, contributed to the development of the research framework/solution, computational codes, the derivation of results, and the interpretation of results, and prepared the manuscript.

13. Xu, C., Heidari, Z., and Torres-Verdín, C. 2012. Rock Classification in Carbonate Reservoirs Based on Static and Dynamic Petrophysical Properties Estimated from Conventional Well Logs. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), San Antonio, Texas, 8 – 10 October. SPE 159991.
 - Co-authors: Chicheng Xu, Ph.D. Student, UT Austin; Carlos Torres-Verdín, Professor at UT Austin
 - Qualitative statement of contribution: Chicheng was a Ph.D. student under Dr. Torres-Verdín's supervision. I defined this project after I joined Texas A&M University as an assistant professor. I worked with Chicheng from Dr. Torres-Verdín's team to accomplish the work. I defined the project, contributed to the development of the research framework/solution and the interpretation of results, and participated in manuscript drafting and revision.
12. Popielski, A. C., Heidari, Z., and Torres-Verdín, C. 2012. Rock Classification from Conventional Well Logs in Hydrocarbon-Bearing Shale. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), San Antonio, Texas, 8 – 10 October. SPE 159255.
 - Co-authors: Andy Popielski, M.Sc. Student, UT Austin; Carlos Torres-Verdin, Professor at UT Austin
 - Qualitative statement of contribution: Andy was a M.Sc. student under Dr. Torres-Verdín's supervision. I technically contributed to the results related to the joint inversion of well logs and physical properties of the formation. My contribution to this paper was purely based on my Ph.D. work.

Section B.3. Works published (or in equivalent status) while in previous rank(s) at UT Austin (if applicable)

11. Heidari, Z., Hamman, J. G., Day, P. I., Gorney, D. L., and Alfred, D. 2011. Assessment of Movable Gas Saturation and Rock Typing Based on the Combined Simulation of Petrophysical Borehole Measurements. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 52nd Annual Symposium, Colorado Springs, Colorado, 14 – 18 May.
 - Co-authors: Geoffrey Hamman, Marathon Oil Corporation; Peter Day, Marathon Oil Corporation; David Gorney, Marathon Oil Corporation; Dicman Alfred, Marathon Oil Corporation
 - Qualitative statement of contribution: I performed this project during a summer internship at Marathon Oil Corporation. I contributed to the development of the research framework/solution, technical work, and interpretation of the results, and prepared the manuscript.
10. Heidari, Z., Torres-Verdín, C., and Preeg, W. E. 2011. Quantitative Method for Estimating Total Organic Carbon and Porosity, and for Diagnosing Mineral Constituents from Well Logs in Shale-Gas Formations. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 52nd Annual Symposium, Colorado Springs, Colorado, 14 – 18 May.
 - Co-authors: Carlos Torres-Verdín, Professor at UT Austin; William Preeg, Consultant
 - Qualitative statement of contribution: I performed this project under the supervision of Dr.

Carlos Torres-Verdín. I contributed to the development of the research framework/solution, computational codes, the derivation of results, and the interpretation of results, and prepared the manuscript.

9. Marouby, P., Heidari, Z., and Torres-Verdín, C. 2011. Assessment of In-Situ Elastic Properties of Hydrocarbon-Bearing Shale with the Joint Quantitative Interpretation of Sonic, Nuclear, and Resistivity Logs. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 52nd Annual Symposium, Colorado Springs, Colorado, 14 – 18 May.
 - Co-authors: Phillipe Marouby, M.Sc. Student, UT Austin; Carlos Torres-Verdín, Professor at UT Austin
 - Qualitative statement of contribution: Phillipe was a M.Sc. student under Dr. Torres-Verdín's supervision. I technically contributed to the results related to the joint inversion of well logs and physical properties of the formation. My contribution to this paper was purely based on my Ph.D. work.
8. Heidari, Z. and Torres-Verdín, C. 2010. Estimation of Dynamic Petrophysical Properties of Water-Bearing Sands Invaded with Oil-Base Mud from Multi-Physics Borehole Geophysical Measurements. Presented at the 80th SEG International Exposition and Annual Meeting: Society of Exploration Geophysicists (SEG), Denver, Colorado, 17 – 22 October.
 - Co-authors: Carlos Torres-Verdín, Professor at UT Austin
 - Qualitative statement of contribution: I performed this project under the supervision of Dr. Carlos Torres-Verdín. I contributed to the development of the research framework/solution, computational codes, the derivation of results, and the interpretation of results, and prepared the manuscript.
7. Heidari, Z., Torres-Verdín, C., and Preeg, W. E. 2010. Improved Estimation of Mineral and Fluid Volumetric Concentrations in Thinly-Bedded and Invaded Formations. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 51st Annual Symposium, Perth, Australia, 19 – 23 June.
 - Co-authors: Carlos Torres-Verdín, Professor at UT Austin; William Preeg, Consultant
 - Qualitative statement of contribution: I performed this project under the supervision of Dr. Carlos Torres-Verdín. I contributed to the development of the research framework/solution, computational codes, the derivation of results, and the interpretation of results, and prepared the manuscript.
6. Heidari, Z., Torres-Verdín, C., Mendoza, A., Ijasan, O., Voss, B., and Preeg, W. E. 2009. Rapid, Interactive Assessment of Petrophysical and Geometrical Effects on Density and Neutron Logs Acquired in Vertical and Deviated Wells. Presented at the SPE Annual Technical Conference and Exhibition (ATCE), New Orleans, Louisiana, 4 – 7 October. SPE 124879.
 - Co-authors: Carlos Torres-Verdín, Professor at UT Austin; Alberto Mendoza, Ph.D. Student, UT Austin; Olabode Ijasan, Ph.D. Student, UT Austin; Ben Voss, Research Associate, UT Austin; William Preeg, Consultant

- Qualitative statement of contribution: I performed this project under the supervision of Dr. Carlos Torres-Verdín. I contributed to the development of the research framework/solution, computational codes, the derivation of results, and the interpretation of results, and prepared the manuscript.
5. Heidari, Z., Torres-Verdin, C., Mendoza, A., and Wang, G. L. 2009. Improving the Assessment of Residual Hydrocarbon Saturation with the Combined Quantitative Interpretation of Resistivity and Nuclear Logs. Presented at the Society of Petrophysicists and Well Log Analysts (SPWLA) 50th Annual Symposium, The Woodlands, Texas, 21 – 24 June.
- Co-authors: Carlos Torres-Verdin, Professor at UT Austin; Alberto Mendoza, Ph.D. Student, UT Austin; Gong Li Wang, Postdoctoral Researcher, UT Austin
 - Qualitative statement of contribution: I performed this project under the supervision of Dr. Carlos Torres-Verdin. Alberto and Gong Li contributed to development of forward simulation codes for modeling of nuclear and resistivity logs, respectively. I contributed to the development of the research framework/solution, computational codes, the derivation of results, and the interpretation of results, and prepared the manuscript.
4. Mohammadi, S., Heidari, Z., Pendar, H., Alasty, A., and Vossoughi, G. 2007. Optimal Control of an Assisted Passive Snake-Like Robot Using Feedback Linearization. Presented at the 31st Mechanisms and Robotics Conference, American Society of Mechanical Engineers (ASME), Las Vegas, Nevada, 4 – 7 September.
- Co-authors: Saman Mohammadi, Undergraduate Student, Sharif University of Technology; Hodjat Pendar, Ph.D. Student, Sharif University of Technology; Arya Alasty, Professor at Sharif University of Technology; Gholamreza Vossoughi, Professor at Sharif University of Technology;
 - Qualitative statement of contribution: Saman and I performed this course project under the supervision of Dr. Gholamreza Vossoughi, Dr. Arya Alasty, and one of Dr. Vossoughi's Ph.D. students (Hodjat Pendar). I contributed to the development of the research framework/solution and computational codes, the derivation of results, and the interpretation of results, and participated in manuscript drafting.

Section B.4. Works published (or in equivalent status) while in previous rank(s) at other institutions (if applicable)

3. Basafa, E., Heidari, Z., Tamaddoni, H., Mirbagheri, A., Haddad, O., and Parnianpour, M. 2007. The Effect of Fatigue on Recurrence Parameters of Postural Sway. Presented at ISB, Taipei, Taiwan, 1 – 5 July.
- Co-authors: Ehsan Basafa, M.Sc. Student, Sharif University of Technology; Hossein Tamaddoni, M.Sc. Student, Sharif University of Technology; Alireza Mirbagheri, Ph.D. Student, Sharif University of Technology; Omid Haddad, M.Sc. Student, Sharif University of Technology; Mohammad Parnianpour, Professor at Sharif University of Technology
 - Qualitative statement of contribution: I contributed to the development of the research framework/solution, collecting and interpreting the data, and participated in manuscript drafting.

2. Heidari, Z. and Farahmand, F. 2007. Presenting a Novel Method to Diagnose Knee Laxity Using ANFIS. Presented at ICBME, Tehran, Iran. (This paper is written in Farsi.)
 - Co-authors: Farzam Farahmand, Professor at Sharif University of Technology
 - Qualitative statement of contribution: I performed this project under the supervision of Dr. Farahmand. I contributed to the development of the research framework/solution, collecting and interpreting the data, and prepared the manuscript.

1. Vossoughi, G., Pendar, H., Heidari, Z., and Mohammadi, S. 2005. Conception and Dynamic Modeling of an Assisted Passive Snake-Like Robot Using Gibbs-Appell Method. Presented at the 29th Mechanisms and Robotics Conference, American Society of Mechanical Engineers (ASME), Long Beach, California, 24 – 28 September.
 - Co-authors: Gholamreza Vossoughi, Professor at Sharif University of Technology; Hodjat Pendar, Ph.D. Student, Sharif University of Technology; Saman Mohammadi, Undergraduate Student, Sharif University of Technology
 - Qualitative statement of contribution: I performed this project (my undergraduate final project) under the supervision of Dr. Gholamreza Vossoughi. I contributed to the development of the research framework/solution, the derivations of results, and collecting and interpreting the data, and participated in manuscript drafting.

Effect of Water Salinity and Water-Filled Pore Volume on High-Frequency Dielectric Measurements in Porous Media

Huangye Chen, Texas A&M University, and Zoya Heidari, University of Texas at Austin

Summary

High-frequency dielectric measurements have been attractive candidates for assessment of water-filled porosity in porous media. In the presence of saline water, the water molecules lose their orientation freedom partially because of hydration with ions and make these measurements sensitive to water salinity, which makes the interpretation of the dielectric-permittivity measurements challenging. The effects of water salinity on the real and the imaginary parts of dielectric permittivity have not yet been quantitatively studied in high-frequency (e.g., greater than 1 GHz) measurements. We measured dielectric permittivity of brine at frequencies ranging from 1 MHz to 3 GHz at room temperature and pressure conditions, where water salinity varies between 0 and 160 kiloparts per million (kppm). We also measured the dielectric permittivity of rock samples with different brine saturations. Our experimental results confirmed that there exists a critical frequency above which water salinity does not affect the real part of the dielectric constant, and such critical frequency increases as water-filled porosity and water salinity increase. At high frequencies where the real part of the dielectric constant is independent of the frequency, there exists a critical water-filled porosity below which water salinity has negligible effect on the real part of the dielectric constant. However, when water-filled porosity is higher than this critical value, the real part of the dielectric constant slightly decreases by increasing water salinity. Further, the results showed that at frequencies greater than the critical frequency, there is a critical water salinity below which the imaginary part of the dielectric constant increases as the water salinity increases, whereas the imaginary part of the dielectric constant decreases if the water salinity exceeds the critical value. The quantitative results on the effect of water salinity on dielectric measurements can potentially improve interpretation of dielectric-permittivity measurements for reliable assessment of water-filled porosity and hydrocarbon saturation.

Introduction

Dielectric permittivity of porous media is defined as the ability of porous media to polarize and to store electric charges. Complex relative dielectric permittivity (i.e., dielectric constant) of the porous media is expressed as

$$\epsilon^* = \epsilon'(f) + j\epsilon''(f) = \epsilon'(f) + j\frac{\sigma}{2\pi\epsilon_0 f} + j\epsilon_x, \quad (1)$$

where ϵ_0 is free-space permittivity that is equal to 8.854×10^{-12} F/m, $\epsilon'(f)$ is the real part of the dielectric constant, and $\epsilon''(f)$ is the imaginary part of the dielectric constant, which usually refers to the loss of the energy within the medium and includes two terms. The first term is a function of conductivity of material, σ , at frequency f , and the second term, ϵ_x , is the dipolar relaxation, which is negligible in downhole dielectric tools with measurement frequencies of less than 1.1 GHz. Dielectric measurements are widely used in the petroleum (Gilmore et al. 1987; Hizem et al. 2008) and agriculture (Nelson 1991; Lawrence et al. 1998) industries, as well as soil sciences (Shao et al. 2003), for assessing water-filled porosity of formations, sensing the moisture in grain and seed, and investigating the effect of the soil salinity on the backscattering coefficient, respectively. In this paper, the term “dielectric constant” refers to the complex relative dielectric permittivity.

Electrical-resistivity logs have been conventionally used to assess in-situ petrophysical properties of formations, such as hydrocarbon/water saturation. However, in formations with low water salinity, strong heterogeneity, or conductive rock components such as pyrite and kerogen, interpretation of electrical-resistivity measurements become challenging (Little et al. 2010; Passey et al. 2010; Kethireddy et al. 2014; Chen and Heidari 2016). Because of the previously mentioned limitations, associated with interpretation of electrical-resistivity measurements, dielectric logs have become attractive options, targeting diverse applications and different formations (Hizem et al. 2008). Dielectric logs can be applied to estimate residual oil saturation (Schmitt et al. 2011; Serag El Din et al. 2011; Brahmakulam et al. 2011) and for in-situ enhanced oil recovery (Arora et al. 2010). In addition, dielectric measurements have proved to be reliable for assessment of water-filled porosity in heavy-oil and freshwater formations (Mosse et al. 2009; Little et al. 2010), as well as formations where little mud-filtrate invasion occurs (Brahmakulam et al. 2011).

The dielectric permittivity of rock/fluid systems is controlled by four main dielectric mechanisms: interfacial polarization, electrochemical polarization, molecular-orientation polarization, and electronic polarization. Interfacial polarization, which is attenuated at high-frequency external electric fields, is usually controlled by rock texture and ions (i.e., the Maxwell-Wagner effect), surface conductance, and nonconductive inclusion (Dukhin and Shilov 1974; Grosse 1988). Electrochemical polarization, which is correlated to the cation-exchange capacity (Lasne et al. 2008; Sen 1981a, b, 1984; Wong et al. 1984), is dominant in low-salinity and low-frequency conditions. In the presence of an external electric field, water molecules align their individual electric dipole along the external electric field, which results in molecule-orientation polarization. Compared with water-molecule-orientation polarization, electric polarization is relatively weak and usually relates to rock-matrix permittivity. Hizem et al. (2008) introduced a multifrequency-dispersion tool to measure the formation dielectric constant at multiple frequencies from 20 MHz to 1 GHz. They used the dielectric measurements at a frequency of 1 GHz to estimate the formation water-filled porosity, believing that interfacial polarization at 1 GHz is negligible and water-molecule polarization makes the most important contribution to the dielectric permittivity.

Although there have been conventional techniques for assessment of water-filled porosity by use of dielectric measurements, the interpretation of dielectric measurements remains challenging because dielectric properties of porous media are sensitive to pore-

Journal Paper #32

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10.1190/GEO2016-0545.1



Application of nanoindentation for uncertainty assessment of elastic properties in mudrocks from micro- to well-log scales

Clotilde Chen Valdes¹ and Zoya Heidari²

ABSTRACT

Uncertainty in estimates of elastic properties of soft mudrock components, such as clay minerals and kerogen, can influence well-log-based evaluation of effective elastic properties in organic-rich mudrocks. Existing methods, such as effective medium models for well-log-based assessment of elastic properties, assume a constant stiffness and an idealized shape for rock components. However, these characteristics might vary depending on the distribution and size of that particular component, as well as its adjacent components. Furthermore, there is a significant uncertainty in elastic properties of kerogen in the case of organic-rich mudrocks. The uncertainty associated with the aforementioned parameters on effective elastic properties of rocks has not been investigated in existing publications. In this paper, we quantified the variability in elastic properties of individual mudrock components caused by their spatial distribution, size, and rock fabric at

the microscale and their impacts on well-log-based evaluation of effective elastic properties. We performed nanoindentation mechanical tests on samples from the Haynesville and the lower Eagle Ford Formations, to measure Young's modulus and hardness at targeted locations. Then, we quantified the variability of Young's modulus in the microscale and its impact on effective elastic properties at the micro- and well-log scales. Results reveal significant uncertainties in measurements of elastic properties of soft rock components, associated with their location and size. Young's moduli of individual clay components are higher when located adjacent to stiff rock components, such as large quartz and calcite grains. Results reveal that 25% and 12% uncertainties in measured elastic properties of clay minerals affect well-log-based estimates of effective elastic stiffness coefficients up to 29% and 11% in the Haynesville and the lower Eagle Ford Formations, respectively. These uncertainties can be more significant in cases with a higher concentration of clay minerals and kerogen.

INTRODUCTION

Reliable characterization of mechanical behavior is challenging in organic-rich formations (Mokhtari et al., 2013), yet required for geomechanical modeling (Ostadhassan et al., 2012), successful fracture treatment (Serajian and Ghassemi, 2011), and postfracturing analysis. Mechanical behavior in mudrocks is often evaluated through existing methods for well-log-based assessment of elastic properties, which assimilate rock mass stiffness. Well-log-based assessment of mechanical properties is commonly carried out using a combination of conventional and advanced acoustic well logs, empirical rock-physics relations, and mechanical homogenization formulations. However, rock-physics formulations commonly use ideal assumptions such as linear elasticity of the rock mass. Furthermore, mechanical homogenization formulations only account for

the volumetric concentrations of the rock components, and they assume that the rock components are regularly shaped, and within the elastic deformation regime. Consequently, laboratory measurements are used to correct for the limitations introduced by wireline resolution and micromechanical models in well-log-based estimates of rock-mechanical properties.

Core-scale measurements of rock-mechanical properties provide an accurate description of mechanical behavior in the formation. However, the availability of core samples is very limited, and experimental procedures are often time consuming and costly; therefore, core samples are selected and spaced at depths of interest, which might not be representative for a mechanical model. Furthermore, in organic-rich formations, successful core recovery is a common issue due to uncoupling of interbedded phases and laminations created by clay minerals and natural and mechanical fractures. Moreover,

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Journal Paper #33

From: em.spwla.2e.54d242.98821c2e@editorialmanager.com
To: zoya@utexas.edu
Subject: Your Submission
Date: Thursday, July 27, 2017 3:59:53 PM

CC: cverdin@austin.utexas.edu

Ref.: Ms. No. SPWLA-D-16-00052R3
EXPERIMENTAL QUANTIFICATION OF THE IMPACT OF THERMAL MATURITY ON KEROGEN
DENSITY
Society of Petrophysicists & Well Log Analysts

Dear Dr. Zoya Heidari,

I am pleased to tell you that your work has now been accepted for publication in Petrophysics.

It was accepted on 07/27/2017

Comments from the Editor and Reviewers can be found below.

Please send a copy of the final manuscript in MS Word format directly to me at sprensky@gmail.com.

Thank you for submitting your work to this journal.

With kind regards,

Stephen Prensky
Managing Editor
Society of Petrophysicists & Well Log Analysts

Comments from the Editors and Reviewers:

Reviewer #2: The authors have adequately responded to all of my comments during the revision process. I have no additional comments, questions, or requests!



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Estimating spatial distribution of natural fractures by changing NMR T_2 relaxation with magnetic nanoparticles

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ARTICLE INFO

Keywords:

Natural fractures
Shale gas reservoirs
Magnetic nanoparticles
NMR logging
 T_2 relaxation time

ABSTRACT

Natural fractures have been widely found and thought to be an important factor in creating a complex hydraulic fractures network and improving hydrocarbon production in shale reservoirs. Nuclear magnetic resonance (NMR) is extensively applied to measure in-situ petrophysical properties, and magnetic nanoparticles provide good contrast agents to distinguish hydrogen relaxation time for NMR. The objective of this paper was to estimate spatial distribution of natural fractures in shale gas reservoirs by applying magnetic nanoparticles to change the NMR relaxation times. Firstly, a three-dimensional (3D) reservoir model including multiple natural fractures was built to investigate the flow of nanoparticles and the distribution of volume magnetic susceptibility (VMS) when injecting magnetic nanoparticles. The sensitivity analyses about nanoparticle concentration and nanoparticles size were investigated. Secondly, a forward model was introduced about how to obtain Carr-Purcell-Meiboom-Gill (CPMG) echo decay trains from given relaxation times. Thirdly, an inversion method was presented to convert the typical CPMG echo decay curve into the distribution of T_2 relaxation amplitudes and times. The inversion method was used to show the change of T_2 amplitude and time for the two synthetic cases with and without magnetic nanoparticles.

The dynamic distribution of nanoparticles concentration and VMS are graphically displayed along each time step in 3D mesh. The results show that magnetic nanoparticles bring much larger VMS while most nanoparticles only flow into these natural fractures (NF) directly connected with wellbore. The others' NF have somewhat higher VMS than matrix. Additionally, based on various sensitivity cases, a higher concentration of nanoparticles yields a stronger magnetic field, and larger nanoparticle size could lead to higher VMS, although the nanoparticles face stronger flow resistance and less diffusion movement. The CPMG decay curve is a multi-dimensional exponential function related to relaxation amplitudes and times, and the least squares minimization technique can be applied to obtain the T_2 amplitudes from CPMG curve. The comparison between two synthetic cases shows the amplitude for small T_2 time increases and the amplitude for large T_2 time reduces, which provides a clear indicator to detect the locations of natural fractures because their T_2 largely reduce. The nanoparticle model provides valuable guidance about choosing parameters for optimizing magnetic nanoparticle injection design to enhance VMS and NMR signals. The inversion model introduces an efficient path for estimating T_2 distribution and petrophysical properties from the acquired NMR CPMG signals. Additionally, magnetic Nanoparticles provide excellent relaxation contrasts to distinguish the magnetization signals of formation for estimating the spatial natural fractures distribution. Consequently, in-situ fracture characterization and the development of hydraulic fracture treatments could be beneficially improved.

1. Introduction

Unconventional reservoirs have been explored to bring huge success in satisfying growing energy demands based on the brilliant technologies which make once-marginal economic formations with extra-low

permeability into profitable pay zones. Tight gas reservoirs are currently providing more and more gas production to the world and the increasing trend is expected to continue. Natural gas from shale plays currently contributes about 16 percent of U.S. natural gas production, and it has the potential to significantly increase American's security of energy

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**PGE Budget Council Statement
For
Zoya Heidari, Ph.D.**

Teaching Contribution & Effectiveness

Portfolio

Dr. Heidari has taught one undergraduate course and two graduate courses at UT. The undergraduate course that she taught was PGE337: Introduction to Geostatistics and the graduate courses were PGE383: Rock Physics and PGE385K: Advanced Multi-Well Formation Evaluation. She has also taught one undergraduate course PETE321: Formation Evaluation and one graduate course PETE608: Well-Logging Methods at Texas A&M University before moving to UT. She taught her undergraduate class at UT twice with the registration of about 60 students both semesters, however, the number of students in her undergraduate class at Texas A&M ranged from 113 to 171 students. Her graduate classes at UT had registration of 8 and 15 during the semesters she taught the graduate courses while registration for her graduate class at Texas A&M ranged from 23 to 39 students. She has taught 837 students (736 at Texas A&M and 137 at UT) during the time she has been an assistant professor at both institutions. She is planning to develop a new graduate level class entitled Petrophysics of Unconventional Reservoirs. Her teaching portfolio is very good and the course she is planning to develop would be an excellent course considering the popularity of the subject matter at the present time.

Comparative Ranking

Dr. Heidari's teaching evaluations for her undergraduate class at UT have been above the course evaluations of the other instructors who have taught the same course in the recent past and also have been above or inline with the College average. The undergraduate geostatistics class that she has taught for two semesters is a difficult class for the students due its mathematical nature, however, she has made excellent efforts to make the course more interesting and understandable by using real field problems in her lectures and by preparing applied homework problems and emphasizing the need for geostatistical methods in field applications. Table 1 presents her teaching evaluations scores for spring 2016 and spring 2017 as well as the scores for other instructors who have taught the course in the recent years and the College average for spring 2017.

Table 2 presents her teaching evaluation scores for the graduate level courses she has taught at UT and a comparable graduate level course that she taught at Texas A&M University before joining our faculty at UT as well as the College average for spring 2017. As it can be seen she has been receiving excellent evaluation scores by the students registered in the class. Her approach in teaching the graduate classes has been project oriented. She uses field data in her lectures as well as the assigned projects to stress application of the theories and methods that are covered in the course. Dr. Heidari also supplies the students with software that are developed in her research group for formation evaluation in order for the students to become familiar with the most recent developments in the subject areas and use

the codes in their course projects. The students are also responsible to develop their own software to be used in conjunction with their class projects for interpretation of field data.

Table 1: Teaching Evaluations for PGE 337 (Introduction to Geostatistics). S and F stand for spring and fall semesters, respectively. S16 and S17 (Columns 1 and 2) show the scores for Dr. Heidari. Columns 3-7 present the instructor and course evaluations for PGE 337 taught by other instructors at the PGE department.

Column No.	1	2	3	4	5	6	7	8
Semester	S17	S16	F16	F15	S15	S14	F14	CSE Avg.
Professor	Heidari	Heidari	Other PGE	Other PGE	Other PGE	Other PGE	Other PGE	
Instructor Evaluation	4.4/5	4.0/5	3.4/5	3.5/5	4.1/5	4.2/5	4.0/5	4.2/5 (S2017)
Course Evaluation	4.0/5	3.7/5	3.1/5	3.4/5	3.7/5	3.9/5	3.8/5	4.0/5 (S2017)

Table 2: Summary of graduate-level course/instructor evaluations. S and F stand for spring and fall semesters, respectively. Columns 1-2 and 3-5 represent Dr. Heidari's teaching evaluations at UT and TAMU, respectively.

Column No.	1	2	3	4	5	6
Course/Semester	PGE385K F16	PGE383 F15	PETE608 F14	PETE608 F13	PETE608 F12	CSE Avg. (UT)
University	UT	UT	TAMU	TAMU	TAMU	
Instructor Evaluation	4.4/5	4.9/5	4.28/5	4.52/5	4.49/5	4.1/5 (F2016)
Course Evaluation	4.1/5	4.6/5	N/A	N/A	N/A	3.9/5 (F2016)
Number of Students	15	8	39	32	23	-

Two of our budget council members have observed her teaching and found her to be an excellent teacher who is engaging and motivating and well prepared for her lectures. Professor Torres-Verdin in his evaluation of her lecture states, "I believe that Prof. Heidari has a genuine interest in teaching, engaging, and motivating her students. The high quality of her presentations, notes, and Matlab programming codes clearly indicates that she is very serious about teaching and that she spends a great deal of time preparing for it. She is also concerned about articulating her class with other undergraduate courses taught in our department and makes conscientious effort at reinforcing concepts taught and practiced in other courses. Dr. Heidari is also keenly aware of ABET course requirements and follows the corresponding guidelines for before and after analyses and summaries. It is obvious that she gained a great deal of good experience teaching large undergraduate classes at TAMU." There also several letters in her file as supporting documents from the students

who were students in her classes while she taught at Texas A&M University; they all attest her teaching effectiveness and her devotion and interest in teaching.

Graduate student Advising

She currently supervises 8 graduate students (5 PhD and 3 MS students, one of the MS students is co-supervised by another PGE faculty). She also is involved in supervisory committees of several PhD students in the department. Her load for supervision of graduate students is similar to the average number of students supervised by the associate professors in PGE. She graduated 4 PhDs as sole supervisor and one as co-supervisor and 5 MS students as sole supervisor and 3 as co-supervisor, all at Texas A&M.

Awards and Teaching Recognition

She received the 2015 Society of Petroleum Engineers Innovative Teaching Award. She has also taught workshops for Geology and Geophysics Department at Texas A&M during 2015-2017. She served as the Vice-President of Education for the Society of Petrophysics and Well Log Analysts. She also initiated and conducted a workshop entitled "Symphony of Rock Fluids in the Subsurface," for middle-school girls in order for them to become familiar with the oil and gas energy sector and as well to encourage them to choose a career in the energy sectors. She has taught a course in the formation evaluation area for the distance learning students at Texas A&M; this is very important for PGE department since the department is planning to offer an MS degree program for students who are interested in obtaining degrees via distance learning, her experience in this regard will be very valuable for PGE department.

Concluding Remarks

Based on student comments, CIS comparative rankings, peer evaluation and evidence of continuous improvement, Dr. Heidari's teaching record meets or exceeds expectations for promotion



Kamy Sepehrnoori, Chair
PGE Tenure and Promotion Committee



Mukul M. Sharma



Eric van Oort

Candidate's Summary of Teaching

Table 1. Summary of Course-Instructor Ratings

Metric	Value
Total # of students taught in organized courses	873 (736 TAMU, 137 UT)
Average instructor evaluation for UG courses	UT: 4.2/5, TAMU: 3.95/5
Average instructor evaluation for Grad courses	UT: 4.65/5, TAMU: 4.43/5
Average course evaluation for UG courses	UT: 3.85/5, TAMU: N/A
Average course evaluation for Grad courses	UT: 4.35/5, TAMU: N/A

Table 2. Course Schedule by Semester

Course	F11	S12	F 12	S 13	F 13	S 14	F 14	S 15	F 15	S 16	F 16	S 17
PGE 337										58		56
PETE 321		145		171		158		113				
PETE 311	45											
PGE 385K											15	
PGE 383									8			
PETE 608			23		42		39					

Table 3. Summary of Graduate Students Currently Supervised at UT Austin

Student Name	Co-Supervisor*	Degree	Start Date	Date Reached Candidacy	Date Expected to Reach Candidacy	Expected Graduation Date
Saurabh Tandon	-	PhD	09/2015	Summer 2017		Summer 2018
Artur Posenato Garcia	-	PhD	01/2016		Summer/Fall 2017	Fall 2019
Archana Jagadisan	-	PhD	09/2016		Fall 2017	Summer 2020
Andres Gonzalez	-	PhD	01/2017		Fall 2018	Summer 2022
Chelsea Newgord	-	PhD	09/2017		Fall 2018	Fall 2022
Sonia Arumdati Purba	-	MS	01/2016			Fall 2017
Mohammed Al-Obaidi	-	MS	09/2016			Summer 2018
Naif M. Al-Rubie	Dr. Carlos Torres-Verdin, PGE	MS	09/2016			Summer 2018

4. Summary of Graduate Students Currently Supervised at Texas A&M University

Student Name	Co-Supervisor*	Degree	Start Date	Date Reached Candidacy	Date Expected to Reach Candidacy	Expected Graduation Date
Kai Cheng ¹	John Killough, PETE	PhD	01/2013	May 2017		May 2018

* Provide name of co-supervisor and department.

¹ My students at Texas A&M University were assigned a co-supervisors after I joined UT Austin

Statement of Teaching

Zoya Heidari

Teaching has always been a joyful and fascinating experience for me. It provides me the opportunity to share my knowledge and passion about my field of expertise with the next generation of scientists and engineers who can initiate significant changes in the world. I do my best to make this experience joyful for the students as well, and to lead them to excellence. My ultimate goal as a teacher is to inspire students to discover the knowledge within themselves. I not only explain fundamentals and course materials, but also encourage the students to think and contribute in class. Consequently, the students will be motivated, grasp a deep understanding of the subject, and enjoy their courses. In all my lectures, I build a friendly and at the same time professional relationship with my students, explain the course material with plenty of real-life examples and simple experiments, give them confidence, and motivate them to learn, discover, and enjoy the beauty of science and engineering. At Texas A&M University (TAMU), I have taught Petrophysics (PETE 311) and Formation Evaluation (PETE 321) to undergraduate students and Well Logging Methods (PETE 608) to graduate students. At The University of Texas at Austin (UT Austin), I have taught Introduction to Geostatistics (PGE 337) to undergraduate students and Advanced Multi-Well Formation Evaluation (PGE 385K) and Rock Physics (PGE 383) to graduate students. These courses have given me the opportunity to engage graduate and undergraduate students in my research activities.

Undergraduate Teaching

Table 4 summarizes the course and instructor evaluations in my undergraduate-level classes both at TAMU¹ and UT Austin. At the undergraduate level, my main teaching responsibility has been Formation Evaluation (PETE 321) and Introduction to Geostatistics (PGE 337) at TAMU and UT Austin, respectively. I once co-taught Petrophysics (PETE 311) with Dr. Hisham Nasr-El-Din in fall 2011 at TAMU.

Formation Evaluation: My primary undergraduate teaching responsibility at TAMU was Formation Evaluation (PETE 321), with 110 – 170 junior students per semester. The challenge with teaching Formation Evaluation is that students need to integrate evaluation of different types of formation measurements simultaneously, which look confusing at a first glance, but I turn it into a fascinating game for the students by showing several field examples in class and engaging students in solving the puzzle of what the subsurface looks like based on the data they analyze. To fulfill my goal of making the Formation Evaluation course fascinating for the students, I renovated all the existing course materials, including lecture notes and homework assignments. I included new well-log interpretation techniques in the course content and prepared a course package, including plenty of field examples of well logs. I used these examples during the class to clarify course material, in homework assignments, or in lab sessions for group exercises. Homework assignments and group projects play an important role in my undergraduate classes to help students to understand and master the course material while applying them on real-life problems and to learn to work collaboratively, as will be expected of them in their future careers. From the feedback I have received from my students in Formation Evaluation class, homework assignments and the examples have been very effective in their learning process. I also added an introduction to formation evaluation of organic shale to the course material to educate the students about the current challenges of our industry. Furthermore, I modified the ABET syllabus of this course at TAMU and included these new additions to the course definition. After the first semester of teaching a large Formation Evaluation class, I decided to get feedback from TAMU Center for Teaching Excellence, to enhance my teaching performance. The feedback I received from the experts significantly helped me to improve my teaching skills. A Classroom Observation Feedback Form from Ms. Carolyn L. Sandoval is attached to my package.

Table 4: Summary of my undergraduate-level course/instructor evaluations. S and F stand for spring and fall semesters, respectively. Columns 1-2 and 3-7 represent my teaching evaluations at UT and TAMU, respectively.

Column No.	1	2	3	4	5	6	7	8
Course/Semester	PGE337 S17	PGE337 S16	PETE321 S15	PETE321 S14	PETE321 S13	PETE321 S12	PETE311 F11	College Avg. 17
Instructor Evaluation	4.4/5	4.0/5	4.17/5	4.04/5	4.22/5	3.43/5	3.89/5	4.2/5
Course Evaluation	4.0/5	3.7/5	N/A	N/A	N/A	N/A	N/A	4.0/5
Number of Students	56	58	113	158	171	145	45	-
Final Student Grade	3.12/4	3.2/4	3.08/4	3.2/4	3.08/4	2.83/4	2.91/4	-

¹ All my course evaluations (comments and scores) at TAMU are attached to my package. TAMU has an online course evaluation system. The average participation rate in my course evaluations at TAMU was approximately 70%, which is considered to be high for an online evaluation system. The overall evaluation score is an average of the grades assigned to the following categories: class preparation, assignments, communications, responsiveness, academic concern, availability, fairness in grading, and environment.

Introduction to Geostatistics: After joining UT Austin, I was asked to teach Introduction to Geostatistics (PGE 337) to undergraduate students. Accepting to teach this course was considered a move to push myself out of my comfort zone in my teaching experience, because it was not directly related to my research expertise. Moreover, Geostatistics is typically considered among the least favorite courses in the petroleum engineering departments. I could sense this challenge the first day that I walked into the classroom and immediately decided to change this mentality at UT Austin. Geostatistics is considered a mathematics-oriented course in petroleum engineering and students typically see it far from real-life challenges in their future career. Another challenge in teaching this course at UT Austin is that sophomore, junior, and senior petroleum engineering students as well as students from the Jackson School of Geosciences are all allowed to enroll, which creates a wide range of educational background and knowledge in the class. As an instructor, it was challenging to keep the course interesting and engaging for this wide audience. The approach I took in the Introduction to Geostatistics course was to make it appealing to the students by clarifying the importance of Geostatistics knowledge in real-life and oil-field applications and by providing plenty of real-life and petroleum-related examples. I prepared practice packages including plenty of examples to help students see the application of Geostatistics in the petroleum industry and their daily lives. I redeveloped the course materials for Geostatistics and prepared more than 30 short Matlab codes to help the students practice the concepts in the classroom and afterwards. In my Geostatistics classes, students are asked to bring their laptops to the classroom and use Matlab to practice the concepts by applying them in real-time to the field data. I soon realized that Matlab is also among the least popular software packages for petroleum engineers at UT Austin. However, I did not stop trying to make it interesting for them by showing how the Matlab codes can expedite achieving outcomes from actual field data and large data sets and by explaining the importance of computer programming and its applications in their future career.

One of my objectives in my Geostatistics class was to help students enjoy this course and learn skills which can be used in their future career. I aimed to change the typical mindset about Geostatistics, which makes students think it is boring and useless, when they first take it. I learned that I was successful in achieving my goals based on the comments that I received from my students, especially during the second semester that I taught the course. One of my students wrote in the final course evaluation: "Coming into this class, I honestly thought I was not going to like it. But, Dr. Heidari changed that. She communicated the material very well, one of the best professors I have had at pure teaching. I found that I came to enjoy the material and saw its importance and applications in the industry." Table 5 compares course/instructor evaluations during the two semesters that I taught this course to those from previous semesters.

In sum, I enjoy every moment of teaching undergraduate students. The admiring comments from the students are good indications of the fact that my students enjoy my course as much as I enjoy teaching them. The majority of my students in large-size classes strongly say, "She cares about all her students and their progress."

Table 5: My teaching performance in PGE 337 (Introduction to Geostatistics). S and F stand for spring and fall semesters, respectively. I was the course instructor only during S16 and S17 (Columns 1 and 2). Columns 3-7 are representative instructor and course evaluations for PGE 337, taught by other instructors at the PGE department.

Column No.	1	2	3	4	5	6	7	8
Semester	S17	S16	F16	F15	S15	S14	F14	College Avg. (2017)
Instructor Evaluation	4.4/5	4.0/5	3.4 5	3.5 5	4.1 5	4.2 5	4.0 5	4.2 5
Course Evaluation	4.0/5	3.7/5	3.1 5	3.4 5	3.7 5	3.9 5	3.8 5	4.0 5
Final Student Grade	3.12/4	3.2/4	2.44 4	3.23 4	3.59 4	3.16 4	3.57 4	-

Graduate Teaching

Table 6 summarizes the course and instructor evaluations in my graduate-level classes both at TAMU and UT Austin. My approach in graduate teaching is project oriented. Students will receive 3-5 projects during the semesters. All the projects are designed based on actual formation data. At the graduate level, I used to teach Well-Logging Methods (PETE 608) at TAMU to on-campus and distance learner (DL) students. The emphasis of Well-Logging Methods course at TAMU was on well logging technologies and advanced Formation Evaluation methods. This class was in high demand among students from both the petroleum engineering and geology and geophysics departments as evidenced by reaching its enrollment capacity soon after registration started. After joining UT Austin, I improved and expanded this course to Advanced Multi-Well Formation Evaluation (PGE385K). In both courses, I used plenty of field examples of well logs and core data to make students ready to apply their knowledge to actual formation data and to deeply understand the course materials. While the aforementioned two courses educate students to analyze multi-scale formation data, my Rock Physics course (PGE383) at UT Austin includes fundamental understanding of physical properties of rocks (e.g., electrical, thermal, magnetic, and acoustic properties) and model development with more emphasis on the pore-scale petrophysics. The students learn how to translate physical properties of rocks to their petrophysical and mechanical properties such as porosity, hydrocarbon saturation, permeability, and elastic

properties and how to develop new rock physics models. I provide software/codes developed in my research team as well as pore-scale 3D images of rocks from our research outcomes to the students to experience estimating physical properties of rocks and to develop rock physics models in rocks with complex pore geometry. They get the opportunity of applying these models to interpret actual field measurements. Rock Physics was considered as a new course in the Department of Petroleum and Geosystems Engineering at UT Austin.

Table 6: Summary of my graduate-level course/instructor evaluations. S and F stand for spring and fall semesters, respectively. Columns 1-2 and 3-5 represent my teaching evaluations at UT Austin and TAMU, respectively.

Column No.	1	2	3	4	5	6
Course/Semester	PGE385K F16	PGE383 F15	PETE608 F14	PETE608 F13	PETE608 F12	College Avg. (UT, 2017)
Instructor Evaluation	4.4/5	4.9/5	4.28/5	4.52/5 ²	4.49/5	4.25
Course Evaluation	4.1/5	4.6/5	N/A	N/A	N/A	4.05
Number of Students	15	8	39	32	23	-
Final Grade	3.6/4	3.89/4	3.46/4	3.76/4	3.69/4	-

Distance Learning (DL): I have experienced DL education by teaching Well Logging Methods to DL students at TAMU. Knowing that many of my DL students are working in the industry, I offered them attending the class in real-time with on-campus students and also watching the recorded videos at a later time. I engaged all the distance learners in class activities and teamed them up with on-campus students to strengthen their engagement.

Innovations in Teaching

Inspiration: I inspire students to discover the knowledge within themselves by conducting fundamental and simple rock physics experiments in class and following through with related homework assignments and by practicing through several field examples. For instance, I design simple experiments for my undergraduate courses to teach fundamentals of neutron transport and electrical conductivity, which can be used for evaluation of hydrocarbon reserves. This technique helps students to deeply grasp course material and to strengthen their creativity.

Large Classrooms and Use of Technology: The large enrollment in my undergraduate classes (113-171 at TAMU and average of 57 at UT Austin) has never been an issue for me, with appropriate use of new teaching technologies, such as i-clickers, online course websites, video recording of the lectures, and other IT capabilities. I am always thinking of new techniques for improving my teaching skills in large classes. For instance, in the case of large undergraduate classes, I hold group office hours and practice sessions, where the students can practice course material in smaller groups and ask questions. The students very much like my group office hours and practice sessions/packages.

Cross Disciplinary Integration: The courses I have taught so far are multidisciplinary in nature. I usually have students from both the petroleum engineering and the geology and geophysics departments in my classes. Students learn in my classes that integration is essential for reliable reservoir characterization. I design projects and class exercises that teach the students how to integrate multiscale and multi-physics formation data including core data, well logs, and geological information. I achieve a multidisciplinary approach in both my graduate and undergraduate courses by incorporating relevant geologic-, geophysics-, and petrophysics-related data in field examples. In my graduate-level classes, I encourage my students to work in multidisciplinary teams including petroleum engineers (e.g., reservoir/production engineers and petrophysicists), geoscientists (e.g., geologists and geophysicists), and students from industry (usually DL students, if we have any), during practice sessions/workshops and for project assignments. I hold multidisciplinary workshop sessions on “Completion Petrophysics” and “Unconventional Rock Physics” in some of my graduate-level classes. In these workshops, students practice multidisciplinary teamwork, while learning formation evaluation, rock physics, and petrophysics. In the “Completion Petrophysics” workshop, groups of students with different backgrounds work on four different unconventional data sets and make completion decisions after integrating all the data they are provided with. The outcomes of the discussions in each group are presented by a team representative at the end of the class and criticized by all the students. In the “Unconventional Rock Physics” workshop, students practice core-log integration in my rock physics research laboratory on actual cores and well logs.

Learning from Mistakes: I keep telling my students that it is absolutely fine to make mistakes. It is important to learn from our mistakes. To help students to learn from their mistakes, I (a) give them fast feedback after each exam by grading almost the same day as the exam and by providing the solution to the exam and (b) ask them to go through their mistakes and solve those questions again the day after the exam as a homework assignment.

² This course evaluation constitutes my on-campus students. I received a course evaluation of 3.77/5 for the DL group (10 students).

Student Engagement: I always share the course material with the students before the lecture. Last semester, I started giving students a heads-up and motivation on the materials that I planned to cover during the week, through announcements posted on the Canvas website. To keep students engaged throughout the lecture, I consistently switch between PowerPoint slides, solving examples, document camera, and running Matlab codes. I often distribute copies of examples and practice questions to make the students contribute in solving the examples. I use i-clicker to take students' votes and answers about the examples that I solve in the class. Implementing pre-developed codes in my lectures significantly enhance student engagement. Such an approach sometimes enables real-time sensitivity analysis, proof of concepts, and learning new methods (e.g., Monte-Carlo-based uncertainty analysis in my Geostatistics class) when all the students contribute in generating results in real-time, which makes students excited about the outcome.

Effectiveness of Teaching Approach: The effectiveness of my teaching techniques is proved by (a) the positive feedback I receive from the industry on the knowledge and capabilities of the students taking my classes, (b) the satisfactory feedback and thank you notes from the students after they join the industry about how useful my course has been for them in their career (examples are attached to this package), (c) course evaluations, (d) peer evaluations (attached to this package), and (e) the exams and quizzes designed for evaluating the learning outcome. I consistently monitor the progress of individual students as well as the entire class.

Awards and Recognition for Teaching

I have received the 2015 SPE Innovative Teaching Award from the Society of Petroleum Engineers (SPE). I have also been invited to teach a workshop on "Well-log Interpretation Methods" at the Department of Geology and Geophysics at TAMU from 2015 – 2017, which prepared the students to compete in the AAPG Imperial Barrel Award (IBA) Gulf Coast Regional competition. Their team placed 3rd in the competition in 2016 and 2017. I have also taught 5 industry short courses in the past on Advanced Formation Evaluation and Well Logging Methods. Finally, I have served as the Vice-President of Education (2016 – present) for the Society of Petrophysicists and Well Log Analysts (SPWLA), where I get the opportunity of advancing Education of Petrophysics at an international level (more details are documented in my Statement of Service). The level of competitiveness of all these teaching recognitions is documented in the Statement of Honors and other Evidence of Merit or Recognition. All the aforementioned examples are indications of being recognized as an impactful individual in the education of Formation Evaluation.

Outreach

Inspiring Girls to Pursue STEM Fields: My commitment to excellence in engineering education transcends the college classroom. For instance, I initiated workshops entitled "Symphony of Rocks and Fluids in the Subsurface," for middle-school girls where they learn rock physics by conducting simple innovative experiments. These workshops encourage girls to pursue energy-related careers and education in science, technology, engineering, and mathematics (STEM). More details about this activity are provided in my Statement of Service.

Undergraduate Research Mentorship: I have used teaching as an opportunity to engage both graduate and undergraduate students in my research activities. I have been successful in attracting undergraduate students to research in the field of Formation Evaluation by bringing my research to the classroom. I have published four conference papers with my undergraduate students. I have also been successful in attracting three of these undergraduate students to join my research team to pursue graduate degrees under my supervision.

Future Plans

Overall, my teaching experience has been both enriching and enjoyable at both TAMU and UT Austin. At TAMU, I have supplied major contributions to developing and updating the Formation Evaluation and Well-Logging Methods courses. At UT Austin, I was successful in making Introduction to Geostatistics enjoyable for undergraduate students and excelled my teaching experience in the field of Formation Evaluation through graduate-level courses. I look forward to the opportunity to continue teaching both graduate and undergraduate classes at UT Austin and to educate the future generations of Longhorn petroleum engineers for academia and the petroleum industry.

Although the majority of our graduates will work on unconventional resources in their future careers, there is a lack of courses that cover petrophysics and rock physics of unconventional reservoirs in our graduate and undergraduate programs. To fill this gap, I would like to teach a new graduate-level course on Petrophysics of Unconventional Reservoirs and a new undergraduate-level course on Rock Physics. I also plan to develop a 3D Augmented Reality (AR) "Multi-Physics Rock Laboratory and Exhibit" module, which aims to promote modern education of rock physics. This module can be demonstrated at my classes and workshops in addition to the interactive hands-on experiments. Such an AR module can be used to efficiently explain the role of grains, pore structure, rock fabric, and rock/fluid composition on physical and petrophysical properties of rocks. In addition to the 3D visualizations, this module creates a sense of a wide-range scale, which is challenging to experience on computer monitors or books.

Zoya Heidari
Department of Petroleum and Geosystems Engineering
Course Rating Averages

Tenure candidates must include all years in rank.

All other candidates must include, at minimum, the three most recent years

What source was used to complete this chart? Summary provided by Provost's Office
(e.g., My CIS, summary provided by Provost's Office, etc.)

PGE 383: Rock Physics

Semester	Class Size	Number of Responses	Instructor Rating	Course Rating
Fall 2015	7	7	4.9	4.6
Mean	7	7	4.9	4.6

PGE 337: Introduction to Geostatistics

Semester	Class Size	Number of Responses	Instructor Rating	Course Rating
Spring 2016	56	40	4.0	3.7
Spring 2017	56	46	4.4	4.0
Mean	56	43	4.2	3.9

PGE 385K: Advanced Multi-Well Formation Evaluation

Semester	Class Size	Number of Responses	Instructor Rating	Course Rating
Fall 2016	15	15	4.4	4.1
Mean	15	15	4.4	4.1

Course Instructor Survey Results

Name/EID: HEIDARI, ZOYA (zh732)
 Department: Petroleum/Geosys Engr
 Report Date: 07-21-2017

Semester	Unique Number	Course Number	Course Title	Instruction Type	Enrollment	No. of Surveys Returned	Avg. Overall Instructor Rating	Avg. Overall Course Rating
Fall 2015	19334	PGE 383	ROCK PHYSICS	Organized		7	4.9	4.6
Spring 2016	19215	PGE 337	INTRODUCTION TO GEOSTATISTICS	Organized	56	40	4	3.7
Fall 2016	19453	PGE 385K	ADV MULTI-WELL FORMATION EVAL	Organized	15	15	4.4	4.1
Spring 2017	19115	PGE 337	INTRODUCTION TO GEOSTATISTICS	Organized	56	46	4.4	4

Department of Petroleum and Geosystems Engineering

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MEMORANDUM

May 3, 2016

From: Carlos Torres-Verdín, Professor
To: PGE Department Chairman
Regarding: Review of Dr. Zoya Heidari' lecture

On March 3, 2016, I attended one of Assistant Professor Zoya Heidari's lectures in connection with her undergraduate course PGE337 (Introduction to Geostatistics; Unique No. 19215). This is a compulsory course taken by PGE undergraduate students (typically sophomores and/or juniors) which covers the fundamentals of probability, statistics, random processes, statistical correlations, quantification of spatial and temporal variability, spatial interpolation methods, and determinist and stochastic kriging. The lecture took place in room CPE 2.204 and started sharply at 12:30 PM (Tuesdays and Thursdays). There were 38 students in attendance; at least 10 of these students came in approximately 7 minutes late while one student entered the classroom 15 minutes late (some of them were just coming out from a midterm exam, I was told). My presence was completely unannounced with the intent to "draw" a "random lecture sample." I sat in the back of the room to gauge voice and image delivery. Prior to attending the lecture, I was given access to the course web site on Canvas, and I was able to inspect all digital contents, lectures, homework projects, Matlab exercises, and handouts. In fact, after attending Dr. Heidari's lecture I continued to monitor her material and student interactions through her Canvas website up to the last week of classes.

Some Pertinent Background about Dr. Heidari's Course

This is the first time that Dr. Heidari teaches PGE337. She did not teach a similar course during her academic career at TAMU either. The course does not make use of a specific textbook but rather invokes material from several consultation books. Dr. Heidari uses multiple Matlab programming and plotting utilities to illustrate and expand the concepts covered in class with calculations, graphs, and in-depth examination of consequences of specific calculations. She effectively conducts live Matlab exercises in class to motivate all

conceptual subjects. Students are asked to bring their laptops to class to perform live Matlab calculations. Most of the examples are based on petroleum engineering calculations which include petrophysical concepts, well logs, and reservoir engineering themes, among others, with the intent to articulate teachings from other courses and so that students can apply what they learn to other courses in their curriculum. The most important prerequisite for this class is PGE368 (Formulation and Solutions of Geosystems Engineering Problems), which introduces undergraduate PGE students to numerical methods for the solution of various engineering equations, adopting Matlab as the computer programming resource.

The Canvas website for Dr. Heidari's course is extremely well organized. Dr. Heidari effectively uses all the digital resources available to her on Canvas and she posts her lecture material (PDF files converted from PPTs and Matlab files) several lectures ahead of time to motivate students to study lecture content before coming to class. She promptly posts all homework and exam solution sets and very frequently interacts with her students through Canvas or e-mail. Dr. Heidari developed all her class material from "scratch." I am quite certain that she invested a significant amount of time developing her class material because of the very high quality of her slides and notes, and because of the profusion of guiding notes in her Matlab files. All Matlab exercises and attending files are carefully verified before being posted on Canvas.

General Comments about the Reviewed Lecture

Dr. Heidari began her lecture with some announcements about an upcoming second midterm exam. After that, she started the formal lecture with a review of subjects and concepts considered in the previous session. The central topics of the new lecture were (a) the concept and quantification of statistical quantiles of random variables, and (b) least-squares linear regression. She carefully reaffirmed the concept of quantiles and their relationship to PDFs and CDFs of random variables using various examples drawn from petroleum engineering and emphasizing the so-called Q-Q plot. After that, she introduced and motivated the concept of least-squares linear regression with petrophysics-based examples, such as the calculation of permeability from total porosity (using a logarithmic transformation to linearize the relationship between the two variables). She emphasized the importance of appraising the residuals stemming from the least-squares fit, such as their PDF and their chi-squared distribution to assess possible estimation biases. Finally, she described the calculation of error bars in the input data and how they could be used to improve the least-squares linear regression. Multiple examples of application were conducted with three separate Matlab exercises previously posted on Canvas. Students were asked to conduct the exercises on their own by modifying several input variables and by examining the consequence of those changes on the estimations via very user-friendly plots.

The lecture was delivered using primarily the computer screen. In the process, Dr. Heidari made copious annotations on her PPT presentation using a screen stylus in order to emphasize and reinforce concepts. She provided students with one printed exercise handout and occasionally used the whiteboard to interact with them. Most of the students in the first three rows were very active asking and answering questions.

Teaching Style

Dr. Heidari used the microphone during the lecture. At the outset, she verbalized the concepts that she intended to teach during the lecture and she described the teaching material that she intended to use. She paused when changing subjects and took time to introduce new subjects as they arose during the lecture. Dr. Heidari frequently walked and changed her field of view as the lecture progressed making eye contact with her students and asking them questions about concepts while simultaneously attempting to circle back to concepts discussed in previous lectures. Dr. Heidari's voice was at times low despite using the microphone and was difficult for me to follow her from the back of the room because of the chatter by some students. However, she displayed good command of the class and students frequently asked her questions, which she answered very well and without patronizing or talking down to them. Most importantly, she displayed an excellent technical command of the subject matter.

I also noticed that during the lecture several students were often engaged in texting or video gaming with their cell phones, three students were eating, and three students who were seating two rows in front of me were conducting loud conversations about non-class subjects. A few students were "abusing" the use of their laptops by accessing web sport sites and/or YouTube. Furthermore, two students left the room during the lecture and came back after more than 10 minutes; one of them left the classroom to answer a phone call. The above activities were clearly distracting to the students seating in the back of the room. Dr. Heidari gave students a two-minute "cell phone break" after 50 minutes of continuous lecture. Some students left the room and came back several minutes after the break was over.

Additional Notes on Course Material and Office Hours

Based on my inspection of the Canvas website, thus far (this is the last week of classes) Dr. Heidari has posted 11 homework assignments and has conducted 3 midterm exams and 4 pop quizzes. Homework and exam solution sets are very detailed and easy to follow. Dr. Heidari holds regular and extra office hours with almost no time limit, and she answers Canvas e-mails all the time, including late hours of the day and weekends. She held additional question-and-answer sessions prior to her 3 midterm exams. Her class syllabus is very detailed about class policies, technical content, teaching style, suggested references, and required background material. She has one full-time TA assisting her during the course.

My Evaluation

I believe that Prof. Heidari has a genuine interest in teaching, engaging, and motivating her students. The high quality of her presentations, notes, and Matlab programming codes clearly indicates that she is very serious about teaching and that she spends a great deal of time preparing for it. She is also concerned about articulating her class with other undergraduate courses taught in our department and makes a conscientious effort at reinforcing concepts taught and practiced in other courses. Dr. Heidari is also keenly aware of ABET course requirements and follows the corresponding guidelines for before and after analyses and summaries. It is obvious that she gained a great deal of good experience teaching large undergraduate classes at TAMU. Even though, in my opinion, her instruction

skills need slight honing, she is progressively developing a natural, relaxed, and spontaneous ability to convey and explore difficult technical concepts in class. Through conversations with her students (some of them are currently taking my undergraduate class), I know that she is a very caring and compassionate instructor too, who pays close attention to their progress and is willing to help them in any possible way. I have no doubts that she will grow to become one of the best instructors in our department.

Some Suggestions

Even though her lecture was well organized and delivered and her course is very well organized, I strongly suggest that Dr. Heidari spend more time motivating the physical intuition and importance behind concepts and procedures. This could be done by spending the first section of the lecture with a pictorial description of the problem to be discussed, its importance in our engineering field of interest, and its consequences. Such an approach will motivate the students to go through the more tedious part of deriving, dissecting, and “playing” with equations. With time, I believe Dr. Heidari will be very comfortable and relaxed to properly modulate her tone of voice. I believe that she is open to and has superior mastery of modern teaching aids. Her next focus should be on improved verbal delivery in order to better engage students during lectures. Likewise, I suggest that her class exercises be less “digested” when conducting them so that her students feel challenged during her lectures. I believe that part of the reason why some students were web browsing or texting during class was because they were not sufficiently challenged during the lecture and because they knew that Dr. Heidari included all the lectures, Matlab exercises, and their results on Canvas. Furthermore, I suggest that Dr. Heidari be more commanding with her class rules to forbid chattering and that she periodically walk to the back of the room to make sure that students are not aimlessly web browsing or texting. I also suggest that she forbid students from taking trips in and out of the classroom because this activity can be very distracting and students need to take their class time very seriously.

To improve in the domains described above, I suggest that PGE resort to FIC (Faculty Innovation Center, Cockrell School of Engineering) personnel to witness at least three of Dr. Heidari’s lectures in order to provide professional feedback concerning course delivery and teaching effectiveness. This approach will undoubtedly improve Dr. Heidari’s teaching abilities and lecture command in a relatively short period of time.

Previous Class Evaluations for PGE337

PGE337 has traditionally been a very difficult course to teach with relatively low average instructor/class evaluations (approximately 3.6). Based on the evidence thus far, I believe that Dr. Heidari will undoubtedly improve that departmental class average. I also hope that, having spent so much quality time preparing her class material from scratch, that she be given more chances to teach the same class in the future to improve it and, why not? Enjoy it!

Feedback given to Dr. Heidari

I met with Dr. Heidari two days after attending her lecture to provide constructive feedback to her. We discussed my observations and she received all my comments with a very positive attitude. It was clear to me that she wants to improve her teaching and, most

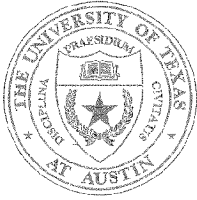
importantly, that she enjoys being an instructor. I commended her for being so thorough and for putting so much work on developing her unique class material. I also told her that I was not as good as an instructor as she is now when I was at the same point in my academic career.

Some Pertinent Background about Dr. Heidari's Course

This is the first time that Dr. Heidari teaches PGE381M. She uses Canvas efficiently to post homework projects, homework solutions, and to communicate with

A handwritten signature in black ink, appearing to read 'C. Torres-Verdin', written over a horizontal line.

Dr. Carlos Torres-Verdin



CENTER FOR PETROLEUM AND GEOSYSTEMS ENGINEERING

200 E. Dean Keeton Street Stop C0304 • CPE 2.502 • Austin, TX 78712-1587 • www.cpge.utexas.edu
(512) 471-7234 • FAX (512) 471-9605

DATE: December 1, 2016

TO: Dr. Jon Olson, Chair
Petroleum and Geosystems Engineering Department
JKW

FROM: Kamy Sepehrmnoori, Professor

RE: Peer Course Evaluation for Dr. Zoya Heidari for PGE385K

Per your request, I audited Dr. Zoya Heidari's class PGE385K "Advanced Multiwell Formation Evaluation," on Monday, November 21, 2016 from 2:00 – 2:50 pm.

I state my observations regarding her teaching as the following:

She arrived to the classroom around 1:52pm and the students gradually walked in the classroom. She started the lecture at 2:00pm by distributing a handout to the students for subsequent use in the lecture. She indicated that the lecture would concentrate on "Introduction to Formation Evaluation of Organic-Rich Mudrocks."

Next she asked if there were any questions about the last lecture or the homework assignment, a student asked for clarification about the homework and she quickly answered the question.

She started the lecture by using slides making references to unconventional resources and made specific comments to shales and how they relate to organic-rich rocks and low permeability reservoirs. Then, she discussed micro fractures in low permeability reservoirs and how such fractures affect the petrophysical measurements. A student asked whether such fractures were natural fractures or were induced due to the fracturing fluids and she replied by saying that it is hard to make that differentiation.

Next, she talked about characteristics of shales by showing pictures of pore structures for carbonated and sandstone rocks and the discussion led to how kerogen resides in sedimentary rocks and she had brought actual samples of kerogens for the students to view and the lecture led to rocks that are rich in minerals.

Subsequently, she referred to the handout logs she distributed at the beginning of the class and asked what type of formation was displayed on the logs and walked through the logs with the students to briefly analyze the logs. There was a nice discussion between the students and Dr. Heidari about the recognition of various formations based on the handout. She went on saying that it is very difficult to perform permeability measurements and come up with a sound relationship between permeability and porosity for such formations. She

also discussed difficulties in performing measurements in very tight formations (unconventional reservoirs) due to the possibility of microfractures.

She gave a summary of the lecture around 2:45pm and mentioned what will be covered in the next lecture.

In summary, I believe Zoya did an excellent job in presenting the lecture. She was alert and asked whether or not the students were following the lecture and encouraged the students to ask questions. I felt that the students were at ease in asking questions.

If you need additional information about this assessment or have any questions, please let me know.

I discussed my peer observation of Zoya on December 8, 2016.

09/02/17
PROGRAM GSPBFRP3

THE UNIVERSITY OF TEXAS AT AUSTIN
OFFICE OF GRADUATE STUDIES
COMMITTEE REPORT, MASTERS AND DOCTORAL
FOR HEIDARI, ZOYA

PAGE: 55

Petroleum + Geosystems Eng

NAME	EID	LAST SEM	COMM POSITION	MAST OR DOCT	DEGREE	FIELD	YYS	2ND DEGREE	FIELD	YYS
BAUTISTA-ANGUIANO, J. C.	job4565	179	MEMBER	D						
ESCOBAR GOMEZ, JUAN DIEGO	jde957	176	MEMBER	D	PH.D.	PETROLEUM ENG	20176			
GHIMIRE, BISHWAS	bg24234	176	MEMBER	D						
JIANG, HAN	hj5446	172	MEMBER	D						
LEE, HYUNG JOO	h15488	179	MEMBER	D						
LUYCX, MATHILDE MICHELE	mm12394	179	MEMBER	D						
MAALOUF, ELSA	em32798	179	MEMBER	D						
PALAVECINO, MAURO ARIEL	mep5249	169	MEMBER	M	M.S.E.	PETROLEUM ENG	20169			
TANG, DAVID GUO	dgt377	179	MEMBER	D						
VICTOR, RODOLFO ARAUJO	rav826	172	MEMBER	D	PH.D.	PETROLEUM ENG	20172			

Zoya Heidari
Department of Petroleum and Geosystems Engineering
List of Postdoctoral Fellows Supervised

- Nima Dabidian, Ph.D., Graduated from The University of Texas at Austin, 2016, Supervised 2016 – 2017 at UT Austin. (postdoctoral researcher)
- Ameneh Rostami, Ph.D., Graduated from Texas A&M University, 2015, Supervised 2016 – Present at UT Austin. (visiting scholar)

Note: At Texas A&M University, assistant professors were discouraged to supervise postdoctoral fellows. Having postdoctoral fellows in the research group was considered as a negative point for promotion from assistant professor to associate professor level. This is the main reason that I have not supervised any postdoctoral fellow at Texas A&M University.

**PGE Budget Council Statement
For
Zoya Heidari, Ph.D.**

Research, Publications & Other Evidence of Scholarship/Creativity

PROMOTION CANDIDATE'S ACADEMIC/RESEARCH BACKGROUND

Dr. Heidari received a Ph.D. degree in 2011 in Petroleum Engineering from The University of Texas at Austin (UT Austin). From 2011 to 2015 she held the position of Assistant Professor with the Harold Vance Department of Petroleum Engineering at Texas A&M University (TAMU). She started her appointment as Assistant Professor with the Department of Petroleum and Geosystems Engineering at UT Austin in the Fall 2015 semester, transferring from TAMU. If successfully promoted to Associate Professor, Dr. Heidari will be in the rank of Assistant Professor for 4 years at TAMU and 3 years at UT Austin. Dr. Heidari is not seeking early promotion.

AREAS OF RESEARCH

Dr. Heidari's research is focused on the *in-situ* formation evaluation and petrophysical assessment of spatially complex permeable rocks. The objective of her work is to quantify fluid storage and transport properties of rocks by combining specialized laboratory measurements of rock samples, borehole measurements (well logs), and pore-scale imaging and modeling. She has approached the petrophysical interpretation of clastic rocks, carbonates, and organic mudrocks under a wide variety of *in-situ* fluid conditions and spatial complexity using new multi-physics and multi-resolution methods. Additionally, Dr. Heidari has developed several new methods and algorithms for the quantification of effective physical properties of rocks such as frequency-dependent electrical conductivity, permeability anisotropy, and magnetic-resonance transverse relaxation. She has also introduced new laboratory measurements and procedures for the petrophysical assessment of tight rocks (negligible permeability). In the case of organic mudrocks, Dr. Heidari has advanced new methods to diagnose via borehole geophysical measurements the presence and spatial distribution of proppant used in hydro-fracturing operations. Likewise, she has advanced new procedures for the enhanced *in-situ* assessment of rock properties using a variety of fluid/solid contrast agents, including nanoparticles.

Dr. Heidari's field of expertise is highly competitive. During the last 6 years, she established a well-recognized research group and built one of the most sophisticated and complete petrophysical laboratories in the academic world. Her research work evidences originality and creativity, together with an excellent ability to recognize salient outstanding technical and scientific challenges that can have a positive impact on industry practices.

RESEARCH GRANTS

Dr. Heidari has been successful at securing a combination of federal, foundation, and industry grants to support her research group. Among them, Dr. Heidari secured a highly competitive American Chemical Society (ACS) award (\$100,000) for a research proposal to investigate the effect of spatial connectivity of organic matter on electrical properties of source rocks. She also received \$40,000 from the *Society of Petroleum Engineers* (SPE) in the form of a very competitive Junior Faculty Research Initiation Fellowship. She was also co-PI for a successful multi-million dollar Qatar National Research Foundation grant concerning advanced NMR imaging methods for 3-D analysis of multi-phase flow processes in permeable rocks.

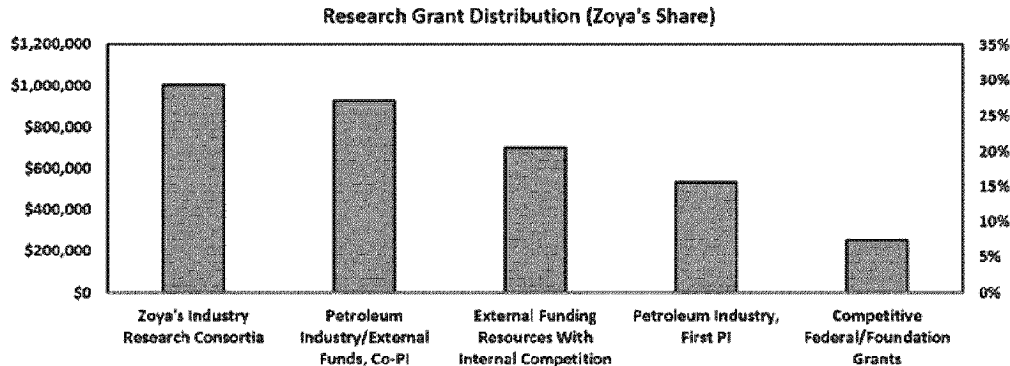
The rest of Dr. Heidari's research grants originate from industry sources. Notably, two of these industry sources are her own joint industry research consortia, one established at TAMU with 8 operating/service companies (total funding = \$900,000.00) and another one established at UT Austin with thus far one operating company (total funding = \$100,000 as of August, 2017).

Some of Dr. Heidari's industry research grants at TAMU came from internal competitions sponsored by TAMU's Crisman Institute. Assignment of grants in the latter venue is by direct competition among faculty from several engineering and geology departments; the grants are renewable on a yearly basis (based on progress, industry feedback, and impact), and provide graduate student support and occasional equipment support. Dr. Heidari's industry funding at TAMU also came from the companies Saint-Gobain Proppants, PetroChina Tarim Oilfield Company, Skoltech Center for Research, and from the Acid Stimulation Research Program (ASRP, a joint industry research consortium directed by Profs. Dan Hill and Ding Zhou). While at UT Austin, Dr. Heidari secured research funding from the Texas Oil and Gas Institute in addition to funds generated from her fledgling joint industry research consortium.

In summary, total research funding raised by Dr. Heidari alone and while in rank is as follows:

Industry Research Consortia	1,000,000
Competitive Federal/Foundation Grants	253,485
External Funding Resources with internal competition	698,203
Petroleum Industry, First PI	533,910
Petroleum Industry/External Funds, Co-PI	928,707
Total	3,414,305

Or, in graphical form, as shown below:

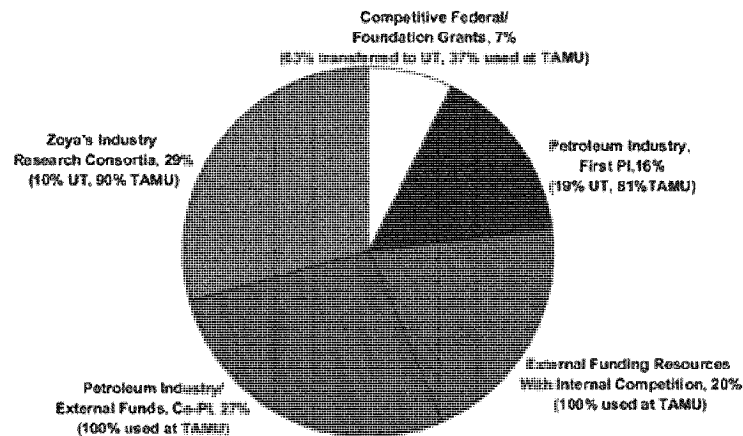


The distribution of research funds between Dr Heidari's appointments at TAMU and UT Austin is as follows:

Initiated at UT Austin	198,910
Initiated at TAMU	3,215,395
Transferred from TAMU to UT Austin	159,942

Dr. Heidari was allowed to transfer only \$159,942 of her TAMU research grants to UT Austin (i.e., the remainder of her research grants from American Chemical Society and Qatar National Research Foundation). She used the rest of her research grants kept at TAMU to financially support her TAMU graduate students, whom she continued to supervise after she moved to UT Austin.

The following pie chart provides a graphical description of research funds secured by Dr. Heidari between her appointments at TAMU and UT Austin:



The above figures are above average for promotion to Associate Professor in the Department of Petroleum and Geosystems Engineering (PGE) and above average in the Cockrell School of Engineering (CSE). Additionally, those figures reflect positively the relationship between total available funding vs. number of supported graduate students and production of refereed

publications in reputable journals (see below), i.e. the numbers reflect a positive and sustainable input-output relationship for Dr. Heidari. It is also important to note that Dr. Heidari's funding did not come mainly during the last two years but spread almost evenly while in rank of Assistant Professor. In fact, it is important to emphasize that Dr. Heidari's funding suffered substantially because of the sudden decrease in oil prices at the same time when she transferred to UT Austin from TAMU. While at TAMU, Dr. Heidari formed her own industry-funded research consortium (something unheard of previously at TAMU), attracted competitive grants and secured recurrent funding from other industry venues. Despite the very challenging environment of low oil prices while at UT Austin, Dr. Heidari managed to secure new industry funding, which is a testament to the relevance and impact of her work, and of her tenacity, even during times of severely contracted industry funding.

Currently, Dr. Heidari is awaiting news about funding proposals submitted to both federal (NSF) and industry sources. She is very persistent in her quest for funding to continue to support her graduate students. There is no doubt that her research funding will be sustainable beyond promotion.

MENTORING OF GRADUATE STUDENTS

While in rank of Assistant Professor, Dr. Heidari graduated 5 Ph.D. students, one of them co-supervised with Dr. Robert Lytton (TAMU), with the co-supervision beginning after Dr. Heidari left TAMU. All of Dr. Heidari's graduated Ph.D. students obtained their degrees at TAMU, with only one of them obtaining her Ph.D. degree after Dr. Heidari left TAMU.

Thus far, while in rank, Dr. Heidari has graduated 6.5 M.Sc. students, 5 being sole supervised, and the rest co-supervised by other TAMU faculty; all of her graduated M.Sc. students earned their degrees at TAMU.

Currently, there are 5 sole-supervised students and 1 co-supervised student in Dr. Heidari's Ph.D.-student pipeline, 1 of whom has already advanced to candidacy (co-supervised TAMU Ph.D. student). Dr. Heidari currently has 5 UT Austin students in her Ph.D. pipeline, 3 of whom have already passed the written component of their Ph.D. qualifying exam. Likewise, she currently supervises 2.5 UT Austin Master's students (one of them is being co-supervised).

Dr. Heidari's graduate student production and mentorship is excellent, and above expectations with respect to promotion averages to Associate Professor in both PGE and CSE. Her current pipeline of Ph.D. and Master's students is also very good. Based on this information, it can be predicted that she will be graduating at least 10 additional Ph.D. students when she applies for promotion to Full Professor. Dr. Heidari's ability to secure research funding from multiple sources will keep pace with her Ph.D. student mentorship. Also, barring persistently low oil prices, it is expected that Dr. Heidari's students be well placed both in industry and academia.

PUBLICATION RECORD

While in rank, Dr. Heidari published 30 refereed journal papers and 59 refereed conference proceedings, out of a total of 34 refereed journal papers and 70 refereed conference proceedings in her cumulative publication record. This is an above-average production for an Assistant Professor in both PGE and CSE. Dr. Heidari publishes in the fields of petroleum engineering, petrophysics, geophysics, and petroleum geology. The journals where she publishes are chiefly mainstream and competitive venues in her field: *Geophysics*, *Interpretation*, *SPE Journal*, *SPE Reservoir Evaluation and Engineering*, *SPE Production and Operations*, *Petrophysics*, *Applied Clay Science*, *Mathematical Geosciences*, and *AAPG Bulletin*.

Most of Dr. Heidari's publications are co-authored with her graduate students: a grand total of 23 refereed papers were co-authored with her graduate students, where 15 of those papers were published after she transferred to UT Austin from TAMU. These numbers are a reliable indication of Dr. Heidari's ability to successfully guide and mentor her graduate students to solve original and impactful problems in her field.

Currently, Dr. Heidari's H-Index is 8 according to Google Scholar, with a total of 317 citations. This is a very good indication of the impact of her research work among academic colleagues worldwide, especially given the fact that most of these citations took place during Dr. Heidari's tenure process.

The 59 conference papers published by Dr. Heidari while in rank are all in very competitive technical conferences (approximately 30% acceptance rate), including international conferences and technical workshops organized by the *Society of Petrophysicists and Well-Log Analysts* (SPWLA) and the *Society of Petroleum Engineers* (SPE). Papers in those conferences are initially accepted based on a 500-word abstract. Subsequently, when the abstract is accepted authors are asked to produce a full-length paper, which receives a small amount of peer review before being finally accepted for publication and presentation at the conference.

Dr. Heidari's publication record is very strong for an Assistant Professor in PGE and CSE. She consistently publishes in the top journals of her field.

RESEARCH AWARDS

Dr. Heidari has already received several coveted professional awards in her relatively young academic career. Most remarkably, she received the 2017 SPE Cedric K. Ferguson Medal (with her Ph.D. student Lu Chi), which recognizes professional achievements in petroleum engineering by an SPE (*Society of Petroleum Engineers*) member in good standing who is younger than 36 and has published in an SPE journal. This is an extremely competitive award and Dr. Heidari is the first faculty with the Department of Petroleum and Geosystems Engineering to receive it because of work completed while in rank. Dr. Heidari was also one of the six recipients of the prestigious and competitive 2012 Petroleum Engineer Junior Faculty Research Initiation Award from the *Society of Petroleum Engineers* (SPE), which is bestowed upon a young faculty with a promising research career and is accompanied by a \$40,000.00 check. She also received the 2014 TEES Select Young Faculty Fellows award at TAMU, which recognizes outstanding young faculty for their research talent, being also the first junior faculty at the TAMU Petroleum Engineering

Department to receive that award. In 2016, Dr. Heidari received the 2016 SPE Regional Formation Evaluation Award from two member regions, the Southwest North America Region and the Gulf Coast North America Region.

It is extremely rare for a young petroleum engineering faculty anywhere in the world to receive the type and number of competitive professional awards already bestowed upon Dr. Heidari. This is strong testament to the importance and impact of her work.

EVIDENCE OF PEER RECOGNITION AND TECHNICAL LEADERSHIP

Besides the research awards received by Dr. Heidari while in rank, she has received several invitations to deliver special presentations at conferences and peer academic departments. She was invited to deliver special graduate seminars at Stanford University, University of Tulsa, and University of Kansas. Additionally, she delivered invited lectures at the *Unconventional Resources Special Interest Group* (URSIG), the *Houston Geological Society* (HGS) Applied Geoscience Conference, the *SPWLA* "Completion Petrophysics" workshop, the *Society of Exploration Geophysicists* (SEG) 2015 post-convention workshop W-10 "Physics of Rocks," the *SPWLA* local chapters, the *SEG/SPE/AAPG/SPWLA/EAGE* summer research workshop, the *SEG* workshop on "Integration of Petrophysics, Rock Physics, and Laboratory Measurements," and *SPE* webinars.

Dr. Heidari has also been invited to deliver technical presentations of her research work by the following companies: BHP Billiton, BP, Aramco Services, Occidental Petroleum Corporation, ConocoPhillips, Chevron, Halliburton, Weatherford, and Anadarko Petroleum Corporation.

Invitations to special conferences, prestigious universities, and industry seminars, are not common for an Assistant Professor in Petroleum Engineering; they give strong credence to the technical leadership and peer recognition that Dr. Heidari has received as a result of her research work during the last 5 years.

Evidence of her strong technical leadership is also the fact that Dr. Heidari was elected by the members of the *Society of Petrophysicists and Well Log Analysts* (SPWLA) to serve on the Society's board of directors. She was also invited to serve as Associate Editor for the *Petrophysics* journal and the *SPE Reservoir Evaluation & Engineering Journal* (Formation Evaluation), two of the top journals in her field.

CRITICAL ANALYSIS OF REFERENCE LETTERS

There were 8 reference letters received from academic experts evaluating Dr. Heidari's promotion dossier. Of those 8 reference letters, 6 referees were suggested by the Budget Council and the remaining 2 by Dr. Heidari herself. Two potential referees declined to provide a letter of reference [Dr. Robert Kleinberg, Schlumberger-Doll Research and a member of the National Academy of Engineering (NAE), and Prof. Albert Reynolds, University], alluding to pressing time commitments and/or lack of knowledge in Dr. Heidari's field of expertise.

Letters of reference for Dr. Heidari come from several internationally recognized experts in the fields of multi-phase flow in permeable media, reservoir engineering, and reservoir description.

Two of the letters were provided by members of the NAE (Dr. Christine Ehlig-Economides, University of Houston, and Dr. Roland Horne, Stanford University). One referee is a former PGE Professor (Dr. Russell Johns, currently at Penn State University), two are Professors with Stanford University (Dr. Ronald Horne, member of the NAE, and Dr. Rosemary Knight), one is a Professor with Colorado School of Mines (Dr. Erdal Ozkan), one is a Professor with Texas A&M University (Dr. Michael King), and one is a Professor with University of Oklahoma (Dr. Chandra Rai). There is a reference from a professor abroad (Dr. Martin Blunt, Imperial College of London). All referees are colleagues who understand well the requirements for promotion to tenure at US universities and who have had former experiences with the promotion process either at their own universities or elsewhere.

The letters of reference uniformly praise Dr. Heidari's research work, technical leadership, and impact to the field. A great majority of the letters indicate in no uncertain terms that Dr. Heidari deserves tenure based on her performance and comparison against similar tenure cases at other universities. They emphasize the fact that Dr. Heidari's contributions and accomplishments during her tenure process are the result of unique and independent work.

The following are salient extracts from the letters of reference:

Prof. Martin Blunt (Imperial College of London, recipient of several *Society of Petroleum Engineers* awards and one of the worldwide leading academic authorities in the fields of pore-scale physics and multi-phase fluid flow in permeable media) writes: "...Dr. Heidari has pioneered new methods to characterize hydrocarbon-bearing shales, described in a series of excellent papers in the petroleum engineering literature. These methods enable the permeability, pore structure and amount of oil to be quantified. She has used NMR, in combination with the use of nanoparticles, to study the connectivity of the pore space of shales, including the impact of micro-fractures. In addition, she has used this work to develop a directional permeability model. She has also studied the electrical properties of shale, which should allow a more accurate and robust assessment of oil saturation. All of this research is practically significant, as it allows the amount of oil in place to be assessed together with its ability to flow. ..."

Prof. Christine Ehlig-Economides (University of Houston, member of the NAE, recipient of several *Society of Petroleum Engineers* awards and a worldwide academic leader in reservoir engineering) writes: "...Dr. Heidari's experimental and computational work to quantify the physics of unconventional reservoirs is of highest importance for the petroleum industry, and it is easy to see why she has been successful in attracting funding for this work. Organic rich formations with very small pores exhibit characteristics that tend to be very different from those observed in conventional reservoirs. The enormous size of the unconventional resources and the technical challenges in producing oil and gas from them economically explain why this research is so vitally important... I am involved in faculty search at the University of Houston and see files for many faculty applicants. Considering numbers of publications and the level of funding she has attracted, Dr. Heidari's accomplishments soar over the applicants we have seen... Dr. Heidari's record speaks for itself. She has been successful in every direction important to tenure track faculty and, from my experience on both department and college level promotion and tenure committees, she would easily be awarded promotion and tenure at TAMU or UH"

Prof. Roland Horne (Stanford University, member of the NAE, recipient of several *Society of Petroleum Engineers* awards, and a worldwide leading academic authority in the fields of reservoir engineering and reservoir description) writes: *"...Her research has represented series of theoretical breakthroughs in quantitative understanding of an important subject to the oil industry. Notably, her research has encompassed theoretical, experimental, and computational approaches... This work is world class, and has advanced our understanding of the distribution and mechanisms of hydrocarbon placement in the porous structures of tight rocks... Her career is on an upward trajectory that indicates that her academic future is bright. Her expertise would be difficult to replace, were she to leave your department... In summary, I have complete admiration for Prof. Heidari's very broad range of achievements and abilities. I therefore have no hesitation in recommending her for a position as Associate Professor, with tenure, in your university."*

Prof. Russell Johns (Pennsylvania State University, recipient of several *Society of Petroleum Engineers* awards, and a worldwide leading academic authority in the fields of reservoir engineering and reservoir description) writes: *"...Zoya's technical papers are of very high quality; her group has developed several important key findings. I am particularly aware of her recent papers that were evaluated for the Cedric K. Ferguson SPE international award. Her paper for "Directional-Permeability Assessment in Formations With Complex Pore Geometry With a New Nuclear-Magnetic- Resonance-Based Permeability Model" won the 2017 Ferguson award, which is given to the best technical paper for authors under 33. This is a major international award that bodes well for her future... Her funding level also greatly exceeds what I would expect from an assistant faculty going up for tenure and promotion... Overall, Dr. Heidari 's research, service, and teaching record clearly exceeds what is required for promotion to associate professor with tenure at Penn State."*

Prof. Rosemary Knight (Stanford University and a leading academic authority in the field of hydrogeophysics) writes: *"...The provided papers are evidence of Prof. Heidara's [SIC] outstanding abilities as a researcher. In her NMR research she has elected to address critical limitations in the current understanding and interpretation of NMR data. Her approach displays a considerable breadth of expertise covering numerous experimental approaches, numerical methods and theoretical analysis. Prof. Heidara [SIC] has an ability to identify key problems and innovative solutions – a combination that leads to significant impact on a field of study... In general, Prof. Heidari's C.V. is comparable to that of others which I have reviewed at the time of tenure. The number of publications is about right; I note a large increase in numbers in the last few years as her graduate students progress in their programs and publish their work. I appreciate seeing the number of publications from graduate students - Prof. Heidari clearly makes mentoring her students through the process of publication a priority, which I believe it should be... My overall impression is that Prof. Heidara [SIC] is an exceptionally talented researcher, who has established a productive research group tackling important problems in innovative ways."*

Prof. Michael King (Texas A&M University, recipient of several *Society of Petroleum Engineers* awards and a leading academic authority in the fields of multi-phase flow in permeable media, reservoir engineering and reservoir description) writes: *"...The techniques she has applied and developed show an excellent understanding of the interplay between measurement and interpretation. By combining local mechanistic models she has been able to infer more than is normally possible, for instance, on the interpretation of directional (tensor) permeability from log*

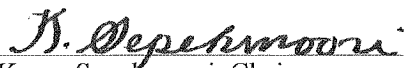
data. Other work has moved away from simple Archie exponents and the interpretation of water saturation in thinly bedded and unconventional reservoirs. Some of her most creative work has focused on the use of injected nanoparticles during formation testing to increase property contrast and to reduce uncertainty in interpretation. She has developed a solid body of work, with an excellent publication record, in multi-scale rock physics interpretation for carbonates and unconventional reservoirs... Of the Assistant Professors in our department at A&M she was one of the two best in her cohort. Where she certainly excelled was in her ability to quickly and effectively leverage her industry contacts to develop an innovative research program, which she "owned" and which would provide a foundation for her research and her students. This was very well done, which certainly places her in the top of her cohort in my estimation."

Prof. Erdal Ozkan (Colorado School of Mines, recipient of several *Society of Petroleum Engineers* awards, and an academic leader in the field of reservoir engineering) writes: "...*First, similar to the rest of her publications, the five publications included in the package are on the application of the NMR technology to the characterization of unconventional reservoirs. This is considered as one of the most promising approaches for the petrophysical characterization of unconventional reservoirs and Dr. Heidari appears to be at the forefront of the research activities on this topic. In summary, based on my review of the documents provided to me and compared to the similar applications I have reviewed in the past, I recommend Dr. Heidari for tenure and promotion to Associate Professor at the Department of Petroleum & Geosystems Engineering at The University of Texas at Austin.*"

CONCLUDING REMARKS

The above information indicates that Dr. Heidari is a successful and productive young member of the academic research community at large. While in rank, she produced a significant and original body of research that made a clear demarcation from her work with her Ph.D. supervisor. Most notably, she developed new laboratory methods and interpretation procedures for the quantification of fluid-transport properties of spatially complex rocks, including organic mudrocks (laboratory research work was not part of her Ph.D. degree). Dr. Heidari's funding and associated publications did not come mainly during the last two years but spread almost evenly while in rank of Assistant Professor. She is making a strong mark in her research field with original, creative, and impactful work, and has quickly become a technical leader in the field of formation evaluation. Her name is present in major conferences in her field and she has received several invitations to participate and showcase her research work, including invited seminars at universities, conferences, and industry. Dr. Heidari has received very prestigious and competitive awards, including the 2017 SPE Cedric K. Ferguson Medal, which give strong credence to her research leadership and innovation. She publishes a very good number of high-quality refereed papers with her graduate students in the top journals of her field. Her refereed journal and conference papers are being cited and her H-Index is steadily growing. Reference letters uniformly recognize her research contributions and endorse promotion. Dr. Heidari's graduate student production is very good and her pipeline of Ph.D. students is excellent and sustainable. She has the ability to secure funding for her research projects from federal and industry sources alike. It is expected that her academic production and stature will continue to grow in the years to come. Hence, the Budget

Council Tenure and Promotion Committee has determined that Dr. Heidari's research record meets or exceeds expectations for promotion.



Kamy Sepennoori, Chair
PGE Tenure and Promotion Committee



Mukul M. Sharma



Eric van Oort



Carlos Torres-Verdin, Ad hoc Committee member

List of the Five Most Significant Works

Zoya Heidari

1. Chi^{*6}, L. and Heidari, Z. 2015. Diffusional Coupling between Microfractures and Pore Structure and its Impact on Nuclear Magnetic Resonance Measurements in Multi-Porosity Systems. *Geophysics* **80** (1): D31 – D42. DOI: 10.1190/geo2013-0467.1
2. Yang*, A., Firdaus*, G., and Heidari, Z. 2016. Electrical Resistivity and Chemical Properties of Kerogen Isolated from Organic-Rich Mudrocks. *Geophysics* **81** (6): D643 – D655. DOI: 10.1190/geo2016-0071.1
3. Chi*, L., Cheng*, K., and Heidari, Z. 2016. Improved Assessment of Interconnected Porosity in Multiple-Porosity Rocks by Use of Nanoparticle Contrast Agents and Nuclear-Magnetic-Resonance Relaxation Measurements. *SPE Reservoir Evaluation & Engineering Journal, Formation Evaluation* **19** (1): 95 – 107. DOI: 10.2118/170792-PA
4. Chi*, L. and Heidari, Z. 2016. Directional-Permeability Assessment in Formations with Complex Pore Geometry with a New Nuclear-Magnetic-Resonance-Based Permeability Model. *SPE Journal* **21** (4): 1436 – 1449. DOI: 10.2118/179734-PA
5. Chen*, H. and Heidari, Z. 2016. Pore-Scale Joint Evaluation of Dielectric Permittivity and Electrical Resistivity for Assessment of Hydrocarbon Saturation Using Numerical Simulations. *SPE Journal* **21** (6): 1930 – 1942. DOI: 10.2118/170973-PA

⁶ * Indicates graduate students under my supervision

Candidate's Summary on Research

Table 1. Research Summary

Metric	Value
Peer-reviewed journal publications (in rank and total)	30 / 34
Peer-reviewed conference proceedings (in rank and total)	59 / 70
Number of journal papers in rank with supervised student(s) from UT as co-author	15 with my students (TAMU and UT) after I joined UT, total of 23 with my students in rank
Total citations of all publications (career) from ISI Web of Knowledge	55
h-index (career) from ISI Web of Knowledge	4
Total citations of all publications (career) from Google Scholar or Publish or Perish	349
h-index (career) from Google Scholar or Publish or Perish	11
Total external research funding raised in rank	\$9,490,449
Total external research funding raised in rank (candidate's share)	\$3,414,305 ¹
Total number of external grants/contracts awarded in rank	16
Number of external grants/contracts awarded in rank as PI	11 (9 single PI, 2 with Co-PIs)

Table 2. External Grants and Contracts Awarded

Total **\$9,490,449**, **My Share \$3,414,305²** (\$2,282,113 as the PI, \$1,132,192 as a Co-PI) Funded Research
+ **\$2,313,638** research funds under consideration/negotiation/review+**\$100,000** pending paperwork at UT Austin
+\$12,000,000 W. D. Von Gonten Rock Physics Laboratory (Initial proposal preparation, Equipment selection and order)

Role of Candidate and Co-Investigators	Title³	Agency	Project Total	Candidate's Share	Grant Period	Institution to which the award was made
PI	Integrated Formation Evaluation in South-central Delaware Basin and North-central Midland Basin Using Well Logs and Core Measurements	Texas Oil and Gas Institute (Part of the UT System, there has been a proposal and research agreement with specific budget, tasks, and timeline)	\$98,910	\$98,910	01/17 – 08/17	UT Austin
PI	Industrial Affiliate Research Program on "Multi-Scale Rock Physics for Unconventional and Carbonate Reservoirs"	BP (will pay for the 2 nd year in August, included in sum) Statoil (under negotiation, not included) Baker Hughes (Letter Attached, not included)	\$100,000 (\$50,000/year per company)	\$100,000 (\$50,000/year per company)	07/16 – present	UT Austin
PI	Joint Industry Research Program on "Formation Evaluation, Petrophysics, and Reservoir Characterization for Unconventional and Carbonate Reservoirs"	Aramco Services Company, BHP Billiton Petroleum, BP, Chevron, ConocoPhillips, and Devon Energy	\$900,000	\$900,000	09/12 – 09/15	TAMU
PI	Application of Acoustic	Saint-Gobain Proppants	\$100,000	\$100,000	01/15 – 01/17	TAMU

¹ \$838,707 was terminated after I left Texas A&M University.

² \$50,000 of this amount is pending paperwork/invoice. I expect to receive the funds in my account in August 2017.

³ Level of competitiveness for each project is documented in an extension to Table 2 presented on Page 3.

	Measurements for Quantifying Mechanical Damage in Propping Agents					
PI	A New Method to Characterize Pore-Structure, Mechanical Damage, and Conductivity of Proppant Packs using NMR Measurements	Saint-Gobain Proppants	\$200,000	\$200,000	01/15 – 01/17	TAMU
Co-PI Grigorios Matenoglou (PI), TAMU Qatar Zoya Heidari (Co-PI), TAMU, UT Austin Vassilios C. Kelessidis (Co-PI), TAMU Qatar Georgios Papavassiliou (Co-PI), NCSR Demokritos Thomas Maris (Co-PI), University of Crete	Advanced Magnetic Resonance Imaging Methodologies for 3-D analysis of Multiphase flow processes in Oil Reservoirs and Enhanced Oil Recovery (NPRP 7-1372-2-498)	Qatar National Research Foundation	\$897,111.06	\$113,484.98 Division of labor: approximately 13%	03/15 – 03/18	TAMU, transferred to UT
PI	Impact of Organic-Matter Spatial Connectivity on Electrical Properties of Organic-Rich Source Rocks	American Chemical Society, Petroleum Research Fund (ACS PRF), Doctoral New Investigator (DNI) Research Grant	\$100,000	\$100,000	09/14 – 09/17	TAMU, transferred to UT
PI	Improved Subsurface Hydrocarbon Estimation in Organic-Rich Source Rocks Using Combined Interpretation of Well Logs and Core Measurements	Society of Petroleum Engineers (SPE) Junior Faculty Research Initiation Fellowship	\$40,000	\$40,000	09/12 – 09/14	TAMU
Zoya Heidari (PI) John Killough (Co-PI)	Application of Nanoparticle Imaging in Quantifying Diagenesis Effects of Propping Agents	Saint-Gobain Proppants	\$180,000	\$135,000 Division of labor: More than 75%	01/13 – 01/15	TAMU
Ding Zhu (PI), TAMU D. A. Hill (Co-PI), TAMU Jiajing Lin (Co-PI), TAMU Yucel Akkutlu (Co-PI), TAMU Zoya Heidari (Co-PI), TAMU	Optimizing Stimulation Treatments for PetroChina Tarim Oilfield Company	PetroChina Tarim Oilfield Company	\$450,000	\$90,000 Division of labor: Approximately 20%	09/13 – 09/16	TAMU
Ding Zhu (PI), TAMU D.A. Hill (Co-PI), TAMU Hisham Nasr-el-din (Co-PI), TAMU Zoya Heidari (Co-PI), TAMU	Acid Stimulation Research Program (ASRP). The projects I was responsible for: <ul style="list-style-type: none"> Petrophysical Rock Classification using Conventional Well Logs to Detect Zones for Acid Stimulation in Carbonate Reservoirs A Quantitative Application of Well Logs to Improve Prediction of Acid Stimulation in Carbonate Formations 	Petroleum Industry (Baker Hughes, Pemex, BG Group, Petrobras, Chevron, Qatar Petroleum, ConocoPhillips, Saudi Aramco, Halliburton, Shell, Maersk, Schlumberger, and Total)	\$1,800,000	\$300,000 Division of labor: Approximately 17% (2 out of 11 projects)	09/12 – 09/15	TAMU
John Killough (PI), TAMU Zoya Heidari (Co-PI), TAMU Yucel Akkutlu (Co-PI), TAMU Berna Hascakir (Co-PI), TAMU Vivek Sarin (Co-PI), TAMU Eduardo Gildin (Co-PI), TAMU	Advanced Computational and Numerical Modeling Techniques for Hydrocarbon Recovery (Proposal: 1401945)	Skoltech Center for Research ⁴	\$3,847,910	\$538,707 Division of labor: Approximately 14%	01/15 – 01/20	TAMU
PI	Enhanced In Situ Assessment of Petrophysical Properties and Kerogen Spatial Distribution in Organic-Rich Source Rocks using Well Logs	Crisman Institute (part of TAMU)	\$313,259	\$313,259	09/13 – 09/16	TAMU
Zoya Heidari (PI), TAMU	Developing Enhanced Well	Crisman Institute (part of	\$313,259	\$234,944	09/13 – 09/16	TAMU

⁴ This project was initiated in collaboration with other universities.

John Killough (Co-PI), TAMU Mark Everett (Co-PI), TAMU	Logging Methods for Fracture Characterization in Organic-Rich Source Rocks using Nanotechnology	TAMU)		Division of labor: More than 75%		
PI	Investigating and Quantifying the Effect of Petrophysical and Compositional Properties on Electrical Resistivity of Organic-Shale Formations to Improve Well-Log Interpretation Methods	Crisman Institute (part of TAMU)	\$60,000	\$60,000	09/11 – 09/13	TAMU
D.A. Hill (PI), TAMU Ding Zhu (Co-PI), TAMU Zoya Heidari (Co-PI), TAMU	My contribution: Quantifying Vertical Heterogeneity in Carbonate Formations using Well Logs for Improving Prediction of Acid Fracturing	Crisman Institute (part of TAMU)	\$90,000	\$90,000 Division of labor: 100%	01/12 – 01/15	TAMU
TOTAL			\$9,490,449	\$3,414,305		

In addition to the aforementioned projects, I contributed in establishing a world-class Rock Physics Laboratory for Unconventional Resources at Texas A&M University (W. D. Von Gonten Laboratory):

- Rock Physics Laboratory for Unconventional Resources, W. D. Von Gonten Laboratories, D.A. Hill, Zoya Heidari, and Yucel Akkutlu, November 2013, \$12,000,000.

My contributions are listed as follows:

- Prepared the first draft of the proposal for the laboratory in 2011 upon joining Texas A&M University
- Contributed actively in expanding the initial proposal for W. D. Von Gonten Laboratories
- Selected up-to-date instruments for the laboratory and finalizing the quotes/orders
- Contributed actively in planning the laboratory set up and
- Prepared test procedures for some equipment

Proposals under Consideration/Negotiation: (\$2,313,638+\$100,000 pending paperwork at UT Austin)

- Integrated Formation Evaluation in South-central Delaware Basin and North-central Midland Basin Using Well Logs and Core Measurements: Phase II, Texas Oil and Gas Institute, \$100,000 (Approved, under contract), Submitted in August 2017, Funded in October 2017
- My Industrial Affiliate Research Program on “Multi-Scale Rock Physics for Unconventional and Carbonate Reservoirs” is under consideration by (Statoil (Funded in October 2017), Baker Hughes, Halliburton, and Occidental Petroleum): \$200,000 per year (supporting letter is attached)
- A proposal submitted to Saudi Aramco on “New In-Situ Reservoir Monitoring Method for Enhanced Hydrocarbon Recovery”: \$1,470,000, submitted in October 2016
- A proposal submitted to Statoil (Norway) on “Enhanced Automatic Fracture Detection and Formation Evaluation using Automatic Joint Interpretation of Image Logs and Conventional Well Logs”: \$200,000, Submitted in June 2017 (they decided to join my IAP)
- NSF CAREER Proposal on “Fundamental Investigation of Electromagnetic Properties of Rocks for Geophysical Characterization of Geothermal Systems”: \$443,638, Submitted in July 2017

Table 2 (Continued). The Level of Competitiveness of the External Grants and Contracts Awarded

Project/Sponsor	Level of Competitiveness
UT Industrial Affiliate Program (IAP)	High, Competition among other Joint Industry Programs (JIPs) and research centers in all the petroleum engineering departments in the world
TAMU Joint Industry Program (JIP)	High, Competition among other Joint Industry Programs (JIPs) and research centers in all the petroleum engineering departments in the world
Qatar National Research Foundation	High, Acceptance rate of approximately 15%
American Chemical Society, Petroleum Research Fund (ACS PRF)	High, Acceptance rate of approximately 20%
Society of Petroleum Engineers (SPE) Junior Faculty Research Initiation Award	High, Acceptance rate of approximately 6% in 2015, when I served as a reviewer
Crisman Institute	Moderate, Through ranking from 10-20 companies whose main interests were typically not Formation Evaluation, Acceptance rate of approximately 30%
Texas Oil and Gas Institute	High, Industry fund (Texas Oil and Gas industry is part of the UT system. I considered this in the industry category,

	because the research project, proposal, budget, reports, funding procedure are very similar to my industry projects)
Saint-Gobain Proppants	High, Industry fund
PetroChina Tarim Oilfield Company	Not enough information to judge, Industry fund
Acid Stimulation Joint Industry Research Program (ASRP)	Moderate/Similar to the case of Industry Research Consortia, but easier due to contributions from the senior faculty as Co-PIs
Skoltech Center for Research	High, Competition among other top institutions in the U.S. Received the Engineering Genesis (EG) award in 2015 and was recognized as one of the top TEES (Texas A&M Engineering Experiment Station) research awards for the year.

Clarifications on the Level of Competitiveness of the External Grants:

Industry Funding in Petroleum Engineering: The industry-funded research projects in my academic career (from September 2011 to August 2017) consists of two main categories: (A) research proposals written on one specific topic and submitted to a collaborating company for funding and (B) research consortia (my joint industry research program at TAMU and my industrial affiliate research program at UT Austin).

Category A: research projects within this category are often initiated after discussions with the petroleum industry, call for ideas from the petroleum industry, or being approached by a company for solving a challenging program that they deal with.

My research projects in this category: projects with Saint-Gobain Proppants, PetroChina Tarim Oilfield Company, and Texas Oil and Gas Institute (part of UT system)

Category B: A proposal has to be prepared for initiating research consortia on a specific field of research. The proposal is then distributed among several companies. PIs should present the idea and research innovations to these companies and invite them to support the proposed program and research vision. The success rate in attracting companies depends on factors such as the research direction/vision and ideas, technical reputation of the PI, as well as economic situation. The competition is among all the university faculty in petroleum engineering (and geosciences in my field of expertise) in the world. Although these research programs are often initiated by senior faculty, I have been successful in independently initiating successful projects in this category two times, once when I started my career at TAMU and once after I joined UT Austin (I have already secured three members for my UT industrial affiliate research program). I started the latter when the oil price was at its local minima.

My research projects in this category: UT Industrial Affiliate Research Program on "Multi-Scale Rock Physics for Unconventional and Carbonate Reservoirs" (current sponsors: BP, Statoil, Wildcat Technologies) and TAMU Joint Industry Research Program on "Formation Evaluation, Petrophysics, and Reservoir Characterization for Unconventional and Carbonate Reservoirs" (sponsors: Aramco Services Company, BHP Billiton Petroleum, BP, Chevron, ConocoPhillips, and Devon Energy)

Acid Stimulation Research Program (ASRP): I had research collaborations on two projects (out of 11 total projects defined as the research plan) within the Acid Stimulation Research Program (ASRP, a joint industry research program (Category B of industry funds), directed by Drs. Dan Hill and Ding Zhu) at TAMU. These two projects, proposed by me, were part of the initial proposal (total projects of eleven) prepared for establishing this research program, which was submitted to several oil and gas companies. I joined the team of PIs for promoting this program for attracting sponsors by making presentations to potential sponsors in the petroleum industry. The funding process/decision making is similar to other joint industry research programs.

Qatar National Research Foundation Research Grant: In the case of proposals submitted to Qatar National Research Foundation, the lead PI has to be affiliated with a submitting institution in Qatar (not necessarily TAMU) and approximately 60% of the fund has to be spent in Qatar. The rest of the PIs can be from anywhere else in the world as long as the lead PI is from Qatar.

Crisman Institute (external funding source with internal competition): The Crisman institute at TAMU was funded by the petroleum industry (10 – 20 companies, this numbers changes every year). The submitted proposals by the faculty were reviewed by the industry members (technical people from 10 – 20 companies, there can be many reviewers from each company). The Crisman committee in the petroleum engineering department was then responsible for selecting the grant winners based on the votes/rankings from the industry members (acceptance rate of approximately 30%, to the best of my knowledge).

Texas Oil and Gas Institute: Texas Oil and Gas institute is part of the UT system. I considered this fund in the industry category, because the research project, proposal, budget, reports, and funding process are very similar to my industry projects (Category A). I submitted a proposal with specific budget, tasks, and timeline to Texas Oil and Gas Institute. This project has a research agreement like other industry-funded projects. They did not issue an RFP, but they have established similar collaborations with other research teams and institutions. To the best of my knowledge, every other faculty is eligible to apply, similar to industry funds. Technical employees of Texas Oil and Gas Institute review the proposal and make decisions.

Skoltech Center for Research: A new Russian university, Skoltech (Skolkovo Institute of Science and Technology), called for proposals in 2013, asking well-established universities put together both a research and teaching program for them. A senior faculty at the Petroleum Engineering department of TAMU, Dr. John Killough, was the lead PI for this proposal. He asked me and five other faculty to serve as Co-PIs and prepare technical proposals. This proposal was prepared in collaboration with other universities. The proposal was reviewed and approved by representatives from Skoltech Center for Research. As I clarified in my research statement, my part in this project was terminated after I left TAMU.

Statement of Research

Zoya Heidari

The petroleum industry is currently in great need of young petrophysicists who can solve the mysteries of unconventional reservoirs. My academic goal is to educate young professional petrophysicists to serve our industry or to join academia and educate future generations of petrophysicists. It is a great pleasure for me to be part of The University of Texas at Austin (UT Austin) and to teach, serve, and have a successful research group at the Department of Petroleum and Geosystems Engineering. Since starting my academic career as an assistant professor at Texas A&M University (TAMU) in September 2011, I have acquired research funding of \$3,414,305 (My share, \$2,282,113 as the PI, \$1,132,192 as a Co-PI, out of a total research fund of \$9,490,449), mentoring 22 graduate and 8 undergraduate students, and writing winning proposals and 89 technical papers.

Research Accomplishments and Impacts

My research focuses on fundamental studies on Multi-Scale Formation Evaluation, in the particular fields of Rock Physics and Petrophysics. The impact of my work is on improved description of multi-phase fluid transport in spatially complex reservoirs, such as carbonates and organic-rich mudrocks (shale), with the intent to enhance production and recovery factors in these reservoirs. The extensive support that I have received from the petroleum industry and the awards I have received are great evidences for the direct application of my fundamental research to the challenges the petroleum industry faces today. The main contributions stemming from my research are the following:

1. Fundamental experimental and computational research in rock physics to quantify physics of unconventional reservoirs and rocks with complex pore/matrix geometry: An example of my fundamental experimental research is quantifying physical properties of pure kerogen (e.g., electrical and mechanical properties) in organic-rich mudrocks as a function of thermal maturity, which affect borehole geophysical measurements as well as core measurements (Yang et al., 2016; Valdes et al., 2017), and are extremely challenging to quantify. This research contributes to enhanced interpretation of geophysical measurements for assessment of hydrocarbon reserves as well as petrophysical and mechanical properties of organic-rich mudrocks. My impact in fundamental computational research includes development of new concepts in interpretation of multi-frequency electromagnetic (EM) and nuclear magnetic resonance (NMR) measurements for real-time detection of productive zones (Chi and Heidari, 2015; Chen and Heidari, 2014; Garcia et al., 2017) to improve interpretation of such measurements in complex formations. The results of these research developments improve assessment of microfracture content, hydrocarbon reserves, and thus, enhance decisions made for production plans to improve recovery factors in complex formations, where conventional methods are not reliable.
2. Develop new physics-based models and experimental techniques for formation evaluation of reservoirs with complex rock physics and for integration of multi-scale formation data: Conventional petrophysical models for interpretation of borehole geophysical measurements are often not reliable in the presence of complex pore/matrix geometry, fractures, and complex rock composition. I developed new experimental methods for improved formation evaluation of complex reservoirs. For instance, I introduced the application of nanoparticle contrast agents to improve assessment of interconnected porosity and fracture network using NMR measurements (Chi et al., 2016). The combined interpretation of NMR relaxometry data before and after nanoparticle injection enables distinguishing connected and isolated pore volumes, which might not be possible in the absence of contrast agents. The paper by Chen and Heidari (2016) is an example of my research on developing physics-based analytical models, which accounts for spatial distribution of rock components (e.g., pore and pyrite networks) through integration of dielectric permittivity and electrical resistivity measurements to improve assessment of hydrocarbon saturation.
3. Quantitatively account for rock fabric (i.e., spatial distribution of rock components) and pore network geometry in the interpretation of rock physical properties for reliable formation evaluation: Rock fabric significantly affects physical properties of formations. However, this impact is not quantitatively taken into account in interpretation of formation data. My research contributes to developing new techniques for quantifying rock fabric (i.e., spatial distribution and connectivity of different rock components) using multi-scale imaging and incorporating it in interpretation of formation data such as EM and NMR measurements. For instance, I introduced a new method that incorporates directional pore-connectivity factor in interpretation of NMR measurements and enables assessment of permeability tensor (Chi and Heidari, 2016). My research has also led to development of other petrophysical models, which quantitatively account for spatial distribution of rock components for interpretation of electrical measurements (i.e., electrical conductivity and dielectric permittivity). Such approach enables minimizing calibration efforts by honoring the realistic physics of rocks.

4. Develop new completion petrophysics techniques: One of the objectives of developing the aforementioned new methods for interpretation and integration of multi-scale formation data is to enhance production and recovery factors in complex reservoirs. Thus, completion petrophysics is one of the research areas that I have eagerly invested on and plan to expand. Examples of my research accomplishments in this multi-disciplinary research area include development of integrated rock classification methods that accounts for stress profile as well as development of new techniques for quantifying proppant damage through acoustic and NMR measurements.

Research Grants

I have successfully acquired research grants from diverse national and international funding resources, including my industry research consortia, individual projects with the petroleum industry, competitive federal/foundation grants, and external funding resources with internal competition. Table 3 summarizes the distribution of my research grants among different funding resources. I have been the first PI for 67% (\$2,282,113 out of \$3,414,305 of my share) and the sole PI for 56% (\$1,912,169 out of \$3,414,305 of my share) of my research funds.

Table 3: Summary of the distribution of my research grants.

Resource	My Share (\$)	Total (\$)
Industry Research Consortia, Single PI	1,000,000 ⁵	1,000,000
Competitive Federal/Foundation Grants	253,485	1,037,111
External Funding Resources With Internal Competition	698,203	776,518
Petroleum Industry, First PI	533,910	578,910
Petroleum Industry/External Funds, Co-PI	928,707	6,097,910
Total	3,414,305	9,490,449

Industrial Affiliate Research Programs: One year after joining TAMU, in September 2012, I initiated the Texas A&M University Joint Industry Program (JIP) on “Multi-Scale Formation Evaluation of Unconventional and Carbonate Reservoirs.” Each signing member contributed \$50,000 per year to the funding of my research team. This research program attracted six renowned oil companies: Aramco Services Company, BHP Billiton, BP, Chevron, ConocoPhillips, and Devon Energy. The objective of this research program was integration of multi-scale formation data through laboratory experiments and numerical simulations for reliable formation evaluation and reservoir characterization. Integration of multi-scale formation data is indeed a gap in the existing Formation Evaluation research programs in academia and a significant opportunity for further research. The first three annual meetings of my JIP were all very successful with several encouraging comments from the industry members (feedback forms are attached). This research program brought new research areas to the Harold Vance Department of Petroleum Engineering at TAMU. Furthermore, it was considered a great platform to educate successful graduate students in the fields of Petrophysics and Formation Evaluation for the future of the petroleum industry and academia. This JIP was terminated after I left TAMU. After joining UT Austin, in an effort to continue my previous program, I initiated the Industrial Affiliate Research Program (IAP) on “Multi-Scale Rock Physics” at The University of Texas at Austin in 2016. Although I initiated this program when the petroleum industry was experiencing a long-lasting downturn and the oil price was almost in its global minima in the time period of 2014 – 2017, I was successful in immediately attracting one major oil company, BP. Three other companies (i.e., Statoil, Baker Hughes, and Occidental Petroleum) are also considering joining this program in 2017. Our first annual meeting will be held on August 16, 2017.

Competitive Federal/Foundation Grants: I have been successful in receiving research grants from the Society of Petroleum Engineers (Junior Faculty Research Initiation Award, acceptance rate of approximately 6% in 2015, when I served as a reviewer), American Chemical Society (Petroleum Research Fund, acceptance rate of approximately 20%), and Qatar National Research Foundation (acceptance rate of approximately 15%) to perform fundamental research in the field of petroleum engineering.

External Funding Resources with Internal Competition: I supervised four projects funded by the Crisman Institute at TAMU. The Crisman institute was funded by the petroleum industry. The submitted proposals by the faculty were reviewed by the industry members (10 – 20 members). The Crisman committee in the petroleum engineering department was then responsible for selecting the grant winners based on the votes/rankings from the industry members (acceptance rate of approximately 30%, to the best of my knowledge).

⁵ \$50,000 of this amount is pending paperwork/invoice. I expect to receive the funds in my account in August 2017.

Petroleum Industry/External Funds: Outside my industry research consortia, I have had other research collaborations with the industry. The most recent one is my research collaboration with the Texas Oil and Gas institute, which contributes to reliable evaluation of reserves in university lands. I have also established successful multi-disciplinary research collaborations to extend my research activities in the field of completion petrophysics. I had a project with Saint-Gobain Proppants Company for two years in collaboration with Dr. John Killough, where I applied well-logging techniques in the field of production engineering for diagnosing proppant diagenesis effects. Because of the great achievements of this collaboration, Saint-Gobain Proppants decided to fund two more projects from me in 2015. I also initiated research collaborations on two projects within the Acid Stimulation Research Program (ASRP, directed by Drs. Dan Hill and Ding Zhu) at TAMU. These two projects, proposed by me, were part of the initial proposal (total projects of eleven) prepared for establishing this research program. I joined the team for promoting this program for attracting sponsors. I also collaborated with a team of production and reservoir engineers on a project funded by PetroChina Tarim Oilfield Company. Finally, I had the opportunity of collaborating with a diverse team of petroleum engineers from TAMU as well as other universities in preparing a proposal for Skoltech Center for Research, which was accepted for funding in 2015. My part in this project was terminated after I joined UT Austin. This project received the Engineering Genesis (EG) award in 2015 and was recognized as one of the top TEES research awards for the year.

Laboratory Establishment: When I decided to join academia, I had a very specific big goal in mind: to establish a strong “Multi-Scale Formation Evaluation” research program. Upon joining TAMU, I prepared a proposal for a multi-million dollar rock physics laboratory, which could help me to start a unique research program, different from the one I raised from at UT Austin. It was not easy to build such a dream laboratory and I had failures. I first tried governmental funds and had unsuccessful negotiations with a potential donor, which were all learning opportunities. The department head and I initiated discussions with Mr. Von Gonten in 2013 about a project which could benefit both the Formation Evaluation developments at TAMU and his consulting company. Further development of my initial proposal in 2014, in collaboration with other faculty, resulted in the establishment of the W. D. Von Gonten (WDVG) Laboratory at College Station, which enjoyed a funded value of approximately \$12million. This laboratory became an invaluable resource for rock physics experimental research in unconventional reservoirs at TAMU. After joining UT Austin in 2015, I used \$700,000 in start-up funds to establish two rock physics laboratories, including a 2 MHz benchtop NMR, multi-frequency signal analyzers, a pulse decay permeameter, and rock pyrolysis equipment as well as a core-flood setup. Approximately \$160,000 of the rock pyrolysis equipment cost came from a donation, which was initiated following one of my presentations at the Houston Geological Society Applied Geoscience Conference in March 2016.

Publications

Table 4 summarizes the number of my journal and conference publications in rank and before rank. I have published my research results in *Geophysics* (6), *Interpretation* (6), *SPE Journal* (3), *SPE Reservoir Evaluation & Engineering* journal (Formation Evaluation) (4), *SPE Production & Operations* journal (2), *Petrophysics* (5), *Applied Clay Science* journal (1), *Journal of Petroleum Science and Engineering* (2), *Mathematical Geosciences* (1), and *AAPG Bulletin* (1). In the case of conference publications, I have mainly published in competitive technical conferences (acceptance rate of approximately 30% or less) such as Society of Petrophysicists and Well Log Analysts (SPWLA) Annual Symposium (29/70) and Society of Petroleum Engineers (SPE) Annual Technical Conference and Exhibition (16/70). Of my conference papers, 68/70 required a full-length paper after acceptance of a short abstract (typically 500-word abstract), which were peer-reviewed by session chairs and technical committee before publication in most of the cases.

Table 4: Summary of my publications count. St. stands for students.

Publications	In Rank	In Rank with Graduate St.	In Rank including Undergraduate St.	Co-authored with Other Faculty & St.	Before Rank	Total
Journal Papers	30	25	0	6	4	34
Conference Papers	59	54	4	13	11	70

Recognition and Awards for Research

Most importantly, I received the prestigious, highly competitive, and international 2017 SPE Cedric K. Ferguson Medal, which recognizes my professional achievements in petroleum engineering. To the best of my knowledge, I am the first faculty member at the Department of Petroleum and Geosystems Engineering who received this award while being at UT Austin. I am also one of the six recipients of the prestigious 2012 Petroleum Engineer Junior Faculty Research Initiation Award from the Society of Petroleum Engineers (SPE). This award recognizes my

excellence in commitment to academic research and student supervision. I have also been awarded a research grant from the American Chemical Society to accomplish a fundamental research project in the field of formation evaluation of organic shale. In November 2014, I was announced as one of the recipients of the 2014 TEES Select Young Faculty Fellows award at TAMU. This award recognizes outstanding young faculty members who have demonstrated their talents for research. I was the first junior faculty at the petroleum engineering department who received this award. Furthermore, my students and I received the best poster presentation and three distinguished presentation awards from SPWLA in 2014 and 2015, which made me listed as one of the 2014-2015 distinguished presenters of SPWLA. Moreover, three of our 2017 SPWLA papers were ranked among the top 10 papers of the symposium. Finally, I received the 2016 SPE Regional Formation Evaluation Award from two regions, the Southwest North America Region and the Gulf Coast North America Region. The level of competitiveness of all these awards is documented in the Statement of Honors and other Evidence of Merit or Recognition.

I was invited to give graduate research seminars in peer institutions including Stanford University, The University of Tulsa, and The University of Kansas as well as to present my team's research achievements in well-known companies such as BHP Billiton, BP, Aramco Services Company, Occidental Petroleum Corporation, ConocoPhillips, Chevron, Halliburton, Weatherford, and Anadarko Petroleum Corporation. I have also been invited to present at several workshops, webinars, and topical conferences. Moreover, I have been invited to serve as an associate editor for the *Petrophysics*, the *SPE Reservoir Evaluation & Engineering* (Formation Evaluation), and the *Geophysics* journals, three of the most relevant journals in my field of expertise. Finally, I have been elected by the members of SPWLA to serve on the board of directors of this society as the Vice-President of Education from 2016 to 2018 (more details are documented in the Statement of Honors and other Evidence of Merit or Recognition.). All the aforementioned examples are indications of being recognized as an impactful individual in the field of Formation Evaluation.

Personal Commitment to Research Excellence and Future Plans

I am a dream follower, and have been successful in fulfilling many of my academic dreams over the past six years. Of course I still have many goals to fulfill, and I am sure that these will grow further and bigger. No matter how challenging the path is, the word "impossible" does not exist in my research philosophy. My research group aims to solve the top challenges in the petroleum and geosciences industries. I see my research team among the top research groups in the fields of Formation Evaluation, Rock Physics, and Petrophysics in the near future. My research activities continue making significant contributions in developing new rock physics models for reliable formation evaluation of challenging reservoirs, such as organic-rich mudrocks.

In the near future, I plan to expand the number of member companies in my "Multi-Scale Rock Physics" IAP. I also have a long-term plan of expanding my current laboratories and to establish a world-class rock physics laboratory at UT Austin, even more glorious than the one I established at TAMU, to make my home university, UT Austin, the center for Formation Evaluation in the world. This requires teaming up with other faculty in the university and attracting funds from the industry. I also plan to extend my research activities to the following areas:

Hydrological sciences: My fundamental research in the field of rock physics can have significant contributions in characterizing and real-time monitoring of ground water resources. For instance, the new techniques I have developed for interpretation of multi-frequency EM and NMR measurements can be used for quantifying water contamination in aquifers as well as hydraulic conductivity, which reduces the need for sampling and can expand spatial boundaries of potentially useful fresh aquifers. I have already initiated collaborations with hydrologists at UT Austin to expand this aspect of my research. The knowledge that will be developed through such multi-disciplinary research collaboration will influence the public's daily life and will be applicable to groundwater resources all over the world for real-time, in-situ, and reliable assessment of water quality and hydraulic conductivity.

Electrochemical interfacial interactions in porous media: In-situ evaluation and modification of electrochemical mineral-fluid interfacial interactions are extremely complex, but crucial for prediction and control of storage and transport of fluids in subsurface rocks. I plan to quantify the impacts of rock morphology, composition, water chemistry, temperature, and pore pressure on mineral-fluid electrochemical interfacial interactions and effective EM and magnetic resonance (MR) properties of the rocks. Pursuing this goal will lead to development of new methods for in-situ and real-time assessment of mineral-fluid interfacial interactions with the intention of modifying them to improve fluid transport properties in spatially heterogeneous rocks. The outcomes of such research efforts and findings can also have significant impacts on (a) carbon sequestration in deep aquifers and its real-time monitoring using geophysical measurements, (b) hydraulic conductivity assessment in aquifers, (c) geothermal energy efficiency, and (d) real-time wettability assessment and control for enhanced hydrocarbon recovery.

New measurement techniques for remote monitoring of porous media: I plan to develop new monitoring techniques for porous media including multi-frequency acousto-electromagnetic measurements. One major impact of this research will be providing a new environmentally-friendly method for pore-throat-size characterization that can be a replacement for conventional mercury-injection-based techniques. Another research project in this category is designing and developing nano-sensors/transmitters, which flow inside porous media. Such sensors enable high resolution measurements with large volume of investigation, which is difficult to achieve with the existing monitoring methods.

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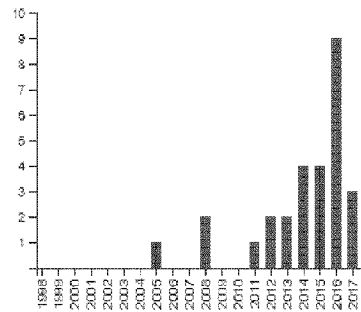
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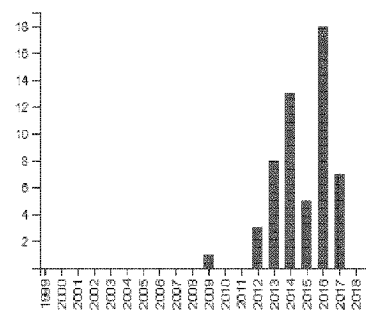
AUTHOR: (Heidari Zoya)

Timespan=All years. Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCL

Total Publications by Year



Sum of Times Cited by Year



Results found: 28
Sum of the Times Cited: 55
Average Citations per Item: 1.96
h-index: 4

		2014	2015	2016	2017	2018	Total	Average Citations per Year
		13	5	18	7	0	55	6.11
1.	Title: Improved estimation of mineral and fluid volumetric concentrations from well logs in thinly bedded and invaded formations By: Heidari, Zoya; Torres-Verdin, Carlos; Preeg, William E. Source: GEOPHYSICS Volume: 77 Issue: 3 Pages: WA79-WA98 Published: MAY-JUN 2012	3	2	4	1	0	15	2.50
2.	Title: Assisted passive snake-like robots: conception and dynamic modeling using Gibbs-Appell method By: Vossoughi, Gholamreza; Pendar, Hodjat; Heidari, Zoya; et al. Source: ROBOTICA Volume: 26 Pages: 267-276 Part: 3 Published: MAY-JUN 2008	3	2	1	0	0	12	1.20
3.	Title: Quantifying the Effect of Kerogen on Resistivity Measurements in Organic-Rich Mudrocks By: Kethireddy, Nikhil; Chen, Huangye; Heidari, Zoya Source: PETROPHYSICS Volume: 55 Issue: 2 Special Issue: SI Pages: 136-146 Published: APR 2014	1	0	5	1	0	7	1.75
4.	Title: Improved estimation of mineral and fluid volumetric concentrations in thinly bedded carbonate formations By: Heidari, Zoya; Torres-Verdin, Carlos; Preeg, William E. Source: GEOPHYSICS Volume: 78 Issue: 4 Pages: D261-D269 Published: JUL-AUG 2013	3	0	0	1	0	4	0.80
5.	Title: Inversion-based method for estimating total organic carbon and porosity and for diagnosing mineral constituents from multiple well logs in shale-gas formations By: Heidari, Zoya; Torres-Verdin, Carlos Source: INTERPRETATION-A JOURNAL OF SUBSURFACE CHARACTERIZATION Volume: 1 Issue: 1 Pages: T113-T123 Published: AUG 2013	2	0	1	0	0	3	0.60
6.	Title: Estimation of dynamic petrophysical properties of water-bearing sands invaded with oil-base mud from the interpretation of multiple borehole geophysical measurements By: Heidari, Zoya; Torres-Verdin, Carlos Source: GEOPHYSICS Volume: 77 Issue: 6 Pages: D209-D227 Published: NOV-DEC 2012	1	1	1	0	0	3	0.50

9/14/2017

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	2014	2015	2016	2017	2018	Total	Average Citations per Year
	13	5	18	7	0	55	6.11
7. Title: Multiscale characterization of pore structure in carbonate formations: Application to the Scurry Area Canyon Reef Operators Committee Unit By: Oyewole, Emmanuel; Saneifar, Mehmoosh; Heidari, Zoya Source: INTERPRETATION-A JOURNAL OF SUBSURFACE CHARACTERIZATION Volume: 4 Issue: 2 Pages: SF165-SF177 Published: MAY 2016	0	0	1	1	0	2	1.00
8. Title: Inversion-based detection of bed boundaries for petrophysical evaluation with well logs: Applications to carbonate and organic-shale formations By: Heidari, Zoya; Torres-Verdin, Carlos Source: INTERPRETATION-A JOURNAL OF SUBSURFACE CHARACTERIZATION Volume: 2 Issue: 3 Pages: T129-T142 Published: AUG 2014	0	0	1	1	0	2	0.50
9. Title: Quantifying the Directional Connectivity of Rock Constituents and its Impact on Electrical Resistivity of Organic-Rich Mudrocks By: Chen, Huangye; Heidari, Zoya Source: MATHEMATICAL GEOSCIENCES Volume: 48 Issue: 3 Pages: 285-303 Published: APR 2016	0	0	1	0	0	1	0.50
10. Title: Application of Conventional Well Logs To Characterize Spatial Heterogeneity in Carbonate Formations Required for Prediction of Acid-Fracture Conductivity By: Saneifar, Mehmoosh; Heidari, Zoya; Hill, A. D. Source: SPE PRODUCTION & OPERATIONS Volume: 30 Issue: 3 Pages: 243-256 Published: AUG 2015	0	0	0	1	0	1	0.33

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Zoya Heidari

Assistant Professor, The University of
Texas at Austin
Petrophysics, Borehole Geophysics,
Formation Evaluation, Rock Physics,

Citation indices
Citations
h-index
i10-index

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	All	Since 2012
Citations	347	328
h-index	11	10
i10-index	14	13

Inverse Problems

Title 1–20

Cited by Year

Improved Estimation of Mineral and Fluid Volumetric Concentrations in
Thinly-Bedded and Invaded Formations

40 * 2010

Z Heidari, C Torres-Verdin, WE Preeg

SPWLA 51st Annual Well Logging Symposium

Assisted passive snake-like robots: conception and dynamic modeling
using Gibbs–Appell method

32 2008

G Vossoughi, H Pendar, Z Heidari, S Mohammadi

Robotica 26 (3), 267-276

Inversion-based method for estimating total organic carbon and porosity
and for diagnosing mineral constituents from multiple well logs in shale-
gas formations

24 * 2013

Z Heidari, C Torres-Verdin

Interpretation 1 (1), T113-T123

Quantifying the Effect of Kerogen on Resistivity Measurements in Organic-
Rich Mudrocks

21 * 2014

N Kethireddy, H Chen, Z Heidari

Petrophysics 55 (2), 136-146

Rock classification in carbonate reservoirs based on static and dynamic
petrophysical properties estimated from conventional well logs

18 2012

C Xu, Z Heidari, C Torres-Verdin

SPE Annual Technical Conference and Exhibition, SPE 159991

Diffusional coupling between microfractures and pore structure and its
impact on nuclear magnetic resonance measurements in multiple-porosity
systems

13 * 2014

L Chi, Z Heidari

Geophysics

Adaptive Neuro-Fuzzy Inference System for Classification of ACL-
Ruptured Knees Using Arthrometric Data

13 2008

Z Heidari, F Farahmand, H Arabalibeik, M Parnianpour

Annals of Biomechanical Engineering 36 (9), 1449-1457

Assessment of residual hydrocarbon saturation with the combined
quantitative interpretation of resistivity and nuclear logs

12 * 2011

Z Heidari, C Torres-Verdin, A Mendoza, GL Wang

http://scholar.google.com/citations?user=z-E_vXwAAAAJ&hl=en

9/14/2017

Title	1–20	Cited by	Year
Petrophysics 52 (03), 217-237			
Rock Classification in the Haynesville Shale Based on Petrophysical and Elastic Properties Estimated from Well Logs M Saneifar, A Aranibar, Z Heidari Interpretation 3 (1), SA65-SA75		11 *	2015
Modeling of Magnetic Nanoparticle Transport in Shale Reservoirs C An, M Alfi, B Yan, K Cheng, Z Heidari, JE Killough SPE Reservoir Simulation Symposium, SPE 173282		11	2015
Quantifying the Impact of Petrophysical Properties on Spatial Distribution of Contrasting Nanoparticle Agents in the Near-Wellbore Region K Cheng, A Aderibigbe, M Alfi, Z Heidari, J Killough PETROPHYSICS 55 (5), 447-460		11 *	2014
Quantifying the directional connectivity of rock constituents and its impact on electrical resistivity of organic-rich mudrocks H Chen, Z Heidari Mathematical Geosciences 48 (3), 285-303		10 *	2016
Rock classification from conventional well logs in hydrocarbon-bearing shale AC Popielski, Z Heidari, C Torres-Verdin SPE Annual Technical Conference and Exhibition, SPE 159255		10	2012
Estimation of dynamic petrophysical properties of water-bearing sands invaded with oil-base mud from the interpretation of multiple borehole geophysical measurements Z Heidari, C Torres-Verdin Geophysics		10 *	2012
Assessment of movable gas saturation and rock typing based on the combined simulation of petrophysical borehole measurements Z Heidari, JG Hamman, PI Day, DL Gorney, D Alfred SPWLA 52nd Annual Logging Symposium		8	2011
Electrical resistivity and chemical properties of kerogen isolated from organic-rich mudrocks A Yang, G Firdaus, Z Heidari Geophysics 81 (6), D643-D655		7 *	2016
Pore-Scale Evaluation of Dielectric Measurements in Formations with Complex Pore and Grain Structures Z Chen, H. and Heidari Petrophysics 55 (6), 587-598		7 *	2014
		7	2013
http://scholar.google.com/citations?user=z-E_vXwAAAAJ&hl=en			9/14/2017

Title	1–20	Cited by	Year
Improved estimation of mineral and fluid volumetric concentrations in thinly bedded carbonate formations			
Z Heidari, C Torres-Verdin, WE Preeg			
Geophysics 78 (4), D261-D269			
Rapid, interactive assessment of petrophysical and geometrical effects on density and neutron logs acquired in vertical and deviated wells		7	2009
Z Heidari, C Torres-Verdin, A Mendoza, O Ijasan, B Voss, WE Preeg			
SPE Annual Technical Conference and Exhibition			
Improved Assessment of Interconnected Porosity in Multiple-Porosity Rocks by Use of Nanoparticle Contrast Agents and Nuclear-Magnetic-Resonance Relaxation Measurements		6 *	2015
L Chi, K Cheng, Z Heidari			
SPE Reservoir Evaluation & Engineering 19 (1), 95-107			

Dates and citation counts are estimated and are determined automatically by a computer program.

**PGE Budget Council Statement
For
Zoya Heidari, Ph.D.**

Academic Advising, Counseling, and Other Student Services

In rank as an Assistant Professor, Dr. Heidari graduated 5 Ph.D. students, 4 of whom were sole-supervised and 1 co-supervised (i.e. 4.5 Ph.D. students total) with Dr. Robert Lytton (TAMU), with the co-supervision beginning after Dr. Heidari had left TAMU. Dr. Heidari's Ph.D. students obtained their degrees at TAMU, with 1 of them obtaining her Ph.D. degree after Dr. Heidari had left TAMU. All of her graduated Ph.D. students found quick employment in industry after graduation, which reflects favorably on Dr. Heidari's role as a student counselor and advisor.

Also while in rank as an Assistant Professor, Dr. Heidari graduated 8 M.Sc. students, 5 of whom were sole-supervised and 3 co-supervised (i.e. 6.5 M.Sc. students total) with Dr. Walter Ayers (TAMU), with 1 student being switched from sole-supervision to co-supervision when Dr. Heidari left TAMU. All of her graduated M.Sc. students earned their degrees at TAMU, with 6 students finding employment in industry after graduation and 2 students continuing on for a Ph.D. degree. Again, this track record reflects very favorably on Dr. Heidari's role as a student counselor.

Dr. Heidari currently has 6 Ph.D. students in preparation, 2 of whom have already taken both the written and oral (proposal defense) Ph.D. qualifying exam with 1 being co-supervised (by Dr. John Killough at TAMU), another 2 having taken the written Ph.D. qualifying exam (with 1 preparing to take the oral exam in summer/fall 2017), and 2 post-M.Sc. students who are preparing to take the Ph.D. qualifying exam (i.e. 5.5 Ph.D. students total). She is also currently supervising 3 M.Sc. students, 2 of whom are sole-supervised and 1 co-supervised (i.e. 2.5 students total) with Dr. Carlos Torres-Verdin. All of the students are supported by Dr. Heidari's research programs and associated funding.

Dr. Heidari's extensive supervision, mentoring and counseling activities do not end here. She is actively involved in mentoring undergraduate students, having mentored 4 students during her time at TAMU and 4 students while at UT Austin for a total of 8 students. Moreover, she has supervised 2 post-doc students while at UT Austin and has supervised 2 distance learning students while at TAMU. Dr. Heidari has also served on the supervisory committees of 29 Ph.D. students and was a reader for 28 M.Sc. theses.

Dr. Heidari is a very effective advisor for her students, working very closely with them in the first 2 years and then giving them more freedom to set out their own direction to experience success and failure. She publishes extensively with her graduate students (23 journal and 55 conference papers to date), and encourages these students and co-authors to present their work at conference and in meetings with sponsors. She has worked effectively with her students to find them internships and job placements after graduation. Out of 13 students graduated by her, 11 joined the oil and gas industry and 2 M.Sc. graduates decided to continue Ph.D. studies. It should be highlighted that 9 out of the 11 students who joined the industry did so during the severe recent downturn (from 2015 onwards) in the petroleum industry.

Dr. Heidari takes pride in promoting diversity, and has in particular taken a lead in mentoring and preparing strong and knowledgeable women engineers. She does this through a variety of activities. For instance, she has actively recruited female graduate students: of the 11 Ph.D. students she has supervised and is supervising, 7 (i.e. 64%) are female. She engages her students in her various outreach activities, for instance her “Symphony of Rocks and Fluids in the Subsurface” program for middle-school girls as part of the Expanding Your Horizons (EYH) program to help encourage girls to pursue higher education STEM fields. Moreover, both at TAMU and UT Austin she has encouraged both undergraduate and graduate students to become active in the SPWLA organization.

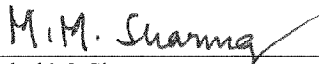
As a service to the graduate students at The University of Texas at Austin, Dr. Heidari furthermore has served on the Petrophysics Ph.D. Qualifying Exam Committee as its chair, as a member on the Writing Ph.D. Qualifying Exam Committee, and as a member of the Graduate Admissions Committee and the Graduate Committee. She has also served on the Women in Engineering Committee as a member at the college level.

Concluding Remarks

The Budget Council Tenure and Promotion Committee has determined that Dr. Heidari’s advising record meets or exceeds expectations for promotion.



Kamy Sepehrnouri, Chair
PGE Tenure and Promotion Committee



Mukul M. Sharma



Eric van Oort

Candidate's Summary of Advising, Counseling, and Other Student Services

Table 1. Summary of Academic Advising

Metric	Value
Student organizations advised	1 (Society of Petrophysicists and Well-Log Analysts Student Chapter, TAMU)
Undergraduate researchers supervised	8
PhD students completed *	4.5 ¹ (4 sole advisor)
MS students completed *	6.5 ² (5 sole advisor)
PhD students in pipeline (as of 09/2017)*	5.5 ³ (5 sole advisor)
MS students in pipeline (as of 09/2017)*	2.5 (2 sole advisor)

Notes:

* Count student as 1.0 if candidate is the sole advisor, count student as 0.5 if the student is co-advised.

Table 2. Degrees Conferred to Graduate Students Supervised

Student Name	Co-Supervisor	Degree	Start Date	Graduation Date	Placement
Mehmoosh Saneifar	-	PhD	01/2012	05/2015	BHP Billiton
Lu Chi	-	PhD	01/2012	08/2015	i-Rock Technologies
Aderonke Aderibigbe	-	PhD	09/2012	05/2016	BHP Billiton
Huangye Chen	-	PhD	01/2013	05/2016	Aramco Services Company
Clotilde Chen Valdes	Dr. Robert Lytton	PhD	09/2013	08/2017	Shell
Nikhil Kethireddy	-	MS	09/2011	12/2013	Occidental Petroleum
Alvaro Aranibar	-	MS	09/2012	12/2014	PrimeEco Group
Gama Firdaus	-	MS	09/2013	08/2015	Continued PhD at Colorado School of Mines
Emmanuel Oyewole	-	MS	01/2014	12/2015	BHP Billiton
Abdelrahman Kotb	-	MS	06/2014	12/2015	Continued PhD at Texas A&M University
Abdalla Ali	Dr. Hisham Nasr-el-Din	MS	09/2014	12/2015	Wells Fargo
Anqi Yang	Dr. Walter Ayers	MS	09/2014	08/2016	Matador Resources
Shahin Amin	Dr. Walter Ayers	MS	09/2015	05/2017	Occidental Petroleum

¹ One of my Ph.D. students (in this category) at Texas A&M University was assigned a co-supervisor after I joined UT Austin

² Three of my M.Sc. students (in this category) at Texas A&M University were assigned a co-supervisor after I joined UT Austin

³ One of my Ph.D. students (in this category) at Texas A&M University was assigned a co-supervisor after I joined UT Austin

Statement of Advising, Counseling, and Other Student Services

Zoya Heidari

In my advising role, I lead my students step-by-step to progress in their research, advise them to become successful professionals, help them to enjoy their research journey, encourage them to dream big and strive to achieve their goals, and support them to pursue a career they deserve after graduation. I have a strong enthusiasm for educating girls and inspiring them to pursue science and engineering and mentoring young professionals, because I would not be in my current professional position had others not encouraged and mentored me through this path. The following sections describe my research team, my academic advising responsibilities at both the undergraduate and graduate levels, and advising student organizations.

Diversity in My Research Team

I have always had a multi-cultural and diverse research team. Since the start of my academic career in 2011, I have supervised eleven Ph.D. students, eleven M.Sc. students, and eight undergraduate students. I have attracted several female Ph.D. students to my research team. Furthermore, I have successfully attracted and engaged undergraduate students in some of the research projects on my team. I have also served as a committee member for an additional forty graduate students from geology and geosciences as well as petroleum engineering departments at both The University of Texas at Austin (UT Austin) and Texas A&M University (TAMU).

Advising Underrepresented Graduate Students: I am particularly proud of preparing strong and knowledgeable women engineers for our conventionally male-dominant industry. Table 3 summarizes the distribution of graduate students in my research group. Among the 22 graduate students that I have advised since 2011, nine of them were female students, which constitutes 64% of my Ph.D. students and 14% of my M.Sc. students. My first five Ph.D. students were female and they all got job offers from some of the most prestigious companies in our field. My very first female Ph.D. student is now serving on the board of directors for the Society of Petrophysicists and Well Log Analysts.

Table 3: Distribution of graduate students in my research group. S and Co represent sole- and co-advisor, respectively.

	Ph.D. Students					M.Sc. Students				
	Completed		In Pipeline		Total	Completed		In Pipeline		Total
	S	Co	S	Co		S	Co	S	Co	
Female	4	1 ⁴	2	0	7 (6S, 1Co)	0	1 ⁴	1	0	2 (1S, 1Co)
Male	0	0	3	1 ⁴	4 (3S, 1Co)	5	2 ⁴	1	1	9 (6S, 3Co)
Total	4	1	5	1	11 (9S, 2Co)	5	3	2	1	11 (7S, 4Co)

Advising Students with Diverse Background: I accept students from different disciplines, to create diversity of knowledge in my research team. Although many of my students start with educational backgrounds (specially my PhD students) different than petroleum engineering, I train them efficiently so that they can perform well in rock-physics-related research and in their future careers in the petroleum industry (Table 6 includes placement of my students). Table 4 lists educational background of my former and current graduate students.

Graduate Advising

Graduate Students and their Status: I have supervised 22 (16 as sole advisor, 6 as co-advisor) graduate students since September 2011 when I joined TAMU as an assistant professor. Of these 22 students, 8 (7 as sole advisor, 1 as co-advisor) are UT students. Table 5 lists all the graduate students whom I supervised in the rank of assistant professor. I have graduated 5 Ph.D. students (4 as sole advisor, 1 as co-advisor) and 8 M.Sc. students (5 as sole advisor, 3 as co-advisor) so far. Five of my graduate students were assigned co-advisors after I left TAMU. As their main advisor, however, I continued directly supervising them, financially supporting them, and publishing with them. My plan for financially supporting my graduate students during the coming year is as follows: Kai will be supported using the remaining of my research funds at TAMU (JIP funds). Saurabh will be supported using my QNRF project. Artur, Archana, and Andres will be supported using my IAP funds (unused funds from BP from 2016-2017, 2017-2018 fund from BP, 2017-2018 fund from Statoil). The processing of the Statoil agreement is planned to be started in August 2017. In the case of any delay in receiving funds from Statoil, I will use my unused start-up funds (approximately 2 students for one year has not been used yet.) for supporting Andres. Chelsea received a fellowship, which supports

⁴ Five of my students at Texas A&M University were assigned co-supervisors after I joined UT Austin.

her until August 2018. I will support her as a graduate research assistant after August 2018. The M.Sc. students under my supervision all have external sponsorship. I also expect to receive research funds from Baker Hughes (letter is attached), which will possibly be used for a new student in the spring semester or to pay my summer 2018 salary. This confirms that I can independently support all my students during the next year, even without counting on TA positions (I often get 1 TA per year for my teaching responsibilities, which can be taken by my graduate students because of their expertise.). It should be noted that my IAP funds are recurring during the upcoming years and some of my pending projects might be accepted for funding. I still have unused start-up funds for student support (approximately half of the initial funds), because I had other funding resources to support my graduate students during the past two years.

Table 4: Summary of the educational background of my former and current graduate students.

Student Name	Degree	Graduation Date	Educational Background (to the best of my knowledge)
Mehrmoosh Saneifar	PhD	05/2015	Petroleum Engineering
Lu Chi	PhD	08/2015	Physics
Aderonke Aderibigbe	PhD	05/2016	Petroleum Engineering
Huangye Chen	PhD	05/2016	Physics
Clotilde Chen Valdes	PhD	08/2017	Civil Engineering
Artur Posenato Garcia	PhD	-	Aerospace/Electrical Engineering
Saurabh Tandon	PhD	-	Mechanical/Petroleum Engineering
Kai Cheng	PhD	-	Material Science
Archana Jagadisan	PhD	-	Geological Engineering
Andres Gonzalez	PhD	-	Petroleum Engineering
Chelsea Newgord	PhD	-	Geophysical Engineering
Nikhil Kethireddy	MS	12/2013	Mechanical Engineering
Alvaro Aranibar	MS	12/2014	Nuclear Engineering
Gama Firdaus	MS	08/2015	Petroleum Engineering
Emmanuel Oyewole	MS	12/2015	Mechanical Engineering
Abdelrahman Kotb	MS	12/2015	Petroleum Engineering
Abdalla Ali	MS	12/2015	Petroleum Engineering
Anqi Yang	MS	08/2016	Chemical Engineering
Shahin Amin	MS	05/2017	Petroleum Engineering
Sonia Arumdati Purba	MS	-	Petroleum Engineering
Mohammed Al-Obaidi	MS	-	Petroleum Engineering
Naif M. Al-Rubie	MS	-	Petroleum Engineering

Advising Method: I work very closely with my graduate students during their first two years and offer them detailed guidelines on their research. After the second year, I give freedom to my students to experience independence and in some cases failure, because failure is an important component of the learning process. I encourage them to present their conference papers themselves, even if it ends up being an average presentation. I also allow my students to show up in front of my industry sponsors and participate in presenting the research outcomes in some cases. I spend an extensive amount of time in practice sessions with my students when they are responsible for presenting the outcome of our research either in conferences or in front of sponsors. Although it often takes more time to prepare them rather than presenting myself, it becomes enjoyable when I see them grow and become successful professionals in the industry. The number of papers I published with my graduate students (23 journal and 55 conference papers), the presentation/paper awards we received, and the placement of my students (Table 6) attest to my effective advising.

Placement of my Graduate Students: I have been supportive to my graduate students in finding internships and with job placements. My graduate students have been very successful in joining well-known and prestigious companies such as BHP Billiton, i-Rock Technologies, Shell, Occidental Petroleum, and Matador Resources. Table 6 summarizes the placement of my graduate students after their graduation and their graduation date. Out of 13 students graduated from my team, 11 decided to join the industry and two M.Sc. graduates decided to continue Ph.D. studies at other institutions after I joined UT Austin. I would like to emphasize that 9 students out of 11 who decided to join the industry graduated during the downturn of the petroleum industry (2015 – 2017), when most of the companies were experiencing a hiring freeze. All of my students, who graduated during this difficult time, were successful in receiving offers from prestigious companies, with their hard work and my support.

Engaging Graduate Students in Outreach Activities: Although the first priority for my graduate students is their research, I try to engage them in outreach activities, if possible. For instance, I encouraged my graduate students to join me in an outreach activity in 2014, where we held a workshop on “Symphony of Rocks and Fluids in the

Subsurface” for middle-school girls as part of the Expanding Your Horizons (EYH) program. My students got the opportunity of interacting with workshop attendees and their parents, explaining complex rock physics in simple words, and encouraging girls to pursue higher education STEM fields.

Table 5: List of all the graduate students whom I supervised in the rank of assistant professor.

Student Name	Co-Supervisor	Degree	Start Date	Graduation Date	Institution	Status
Mehmoosh Saneifar	-	PhD	01/2012	05/2015	TAMU	Graduated
Lu Chi	-	PhD	01/2012	08/2015	TAMU	Graduated
Aderonke Aderibigbe	-	PhD	09/2012	05/2016	TAMU	Graduated
Huangye Chen	-	PhD	01/2013	05/2016	TAMU	Graduated
Clotilde Chen Valdes ⁵	Dr. Robert Lytton	PhD	09/2013	08/2017	TAMU	Graduated
Kai Cheng ⁵	Dr. John Killough	PhD	01/2013	05/2018	TAMU	PhD Candidate, He is currently working in my UT labs
Saurabh Tandon	-	PhD	09/2015	08/2018	UT	PhD Candidate
Artur Posenato Garcia	-	PhD	01/2015	12/2019	UT	Passed the written PhD qualifying exams at TAMU and UT, Plans to become a PhD candidate in Summer/Fall 2017
Archana Jagadisan	-	PhD	09/2016	08/2020	UT	Passed the written PhD qualifying exams, Plans to become a PhD candidate in Fall 2017/Spring 2018
Andres Gonzalez	-	PhD	01/2017	08/2022	UT	Student, He will take written qualifying exams in Spring 2018
Chelsea Newgord	-	PhD	09/2017	12/2022	UT	Student, She will take written qualifying exams in Spring 2019
Nikhil Kethireddy	-	MS	09/2011	12/2013	TAMU	Graduated
Alvaro Aranibar	-	MS	09/2012	12/2014	TAMU	Graduated
Gama Firdaus	-	MS	09/2013	08/2015	TAMU	Graduated
Emmanuel Oyewole	-	MS	01/2014	12/2015	TAMU	Graduated
Abdelrahman Kotb	-	MS	06/2014	12/2015	TAMU	Graduated
Abdalla Ali ⁵	Dr. Nasr-el-Din	MS	09/2014	12/2015	TAMU	Graduated
Anqi Yang ⁵	Dr. Walter Ayers	MS	09/2014	08/2016	TAMU	Graduated
Shahin Amin ⁵	Dr. Walter Ayers	MS	09/2015	05/2017	TAMU	Graduated
Sonia Arumdati Purba	-	MS	01/2016	12/2017	UT	Student
Mohammed Al-Obaidi	-	MS	09/2016	08/2018	UT	Student
Naif M. Al-Rubie	Dr. Carlos Torres-Verdin	MS	09/2016	08/2018	UT	Student

Table 6: Summary of the placement of my graduate students after their graduation and their graduation date.

Student Name	Degree	Graduation Date	Placement (to the best of my knowledge)
Mehmoosh Saneifar	PhD	05/2015	BHP Billiton
Lu Chi	PhD	08/2015	i-Rock Technologies
Aderonke Aderibigbe	PhD	05/2016	BHP Billiton
Huangye Chen	PhD	05/2016	Aramco Services Company
Clotilde Chen Valdes	PhD	08/2017	Shell
Nikhil Kethireddy	MS	12/2013	Occidental Petroleum
Alvaro Aranibar	MS	12/2014	PrimeEco Group
Gama Firdaus	MS	08/2015	Continued PhD at Colorado School of Mines
Emmanuel Oyewole	MS	12/2015	BHP Billiton
Abdelrahman Kotb	MS	12/2015	Continued PhD at Texas A&M University
Abdalla Ali	MS	12/2015	Wells Fargo
Anqi Yang	MS	08/2016	Matador Resources
Shahin Amin	MS	05/2017	Occidental Petroleum

Group Activities: Technical Writing Club and Python Club are examples of team activities that I encourage my students to participate in. I initiated Writing Club for my graduate students in 2013, after I had to rewrite a couple of our conference papers all over again from scratch two days before the deadline. Because technical writing was a challenge for most of my graduate students and many of them had never been trained to write a technical paper. In Writing Club, we get together once a week and practice writing. The students ask questions, help each other, and practice writing. They learn from each other and I get a chance to monitor their progress and help them, if required. I

⁵ This student was assigned a co-supervisor after I joined UT Austin.

revived this Writing Club a couple of months ago at UT Austin. I also recently initiated Python Club, because I realized none of my students know Python and we needed that expertise for some of our projects in my research group. Such team activities make the learning experience more effective and fun.

Remote Advising: After I decided to move to UT Austin, I immediately discussed my decision with my graduate students one-by-one. Seeing some of them crying and struggling to change my mind has been among the most difficult moments of my academic career. I was supervising 15 graduate students at that time. I promised every one of them my full support and attention until they graduate and move on to the next phase of their careers. Based on the negotiations with UT Austin as well as discussions with my students and the department head at TAMU, I continued advising my students and helped them get their degrees from TAMU. Some of them were assigned co-supervisors. However, I continued supporting them financially from my research funds, which remained at TAMU. Only the most junior member of my research team decided to officially transfer to UT Austin. Among the students who remained TAMU students, some of them joined me in Austin to continue working on their projects in my laboratories and those who didn't need specific facilities at UT Austin stayed in College Station. Although College Station is not far from Austin, having graduate students in two different locations was initially challenging. It was not easy to merge Longhorns and Aggies as a unique team. I decided to have both College Station and Austin teams (UT students and TAMU students at UT) in the weekly research meetings. College Station team was attending those meetings remotely. I traveled to College Station frequently to meet with my graduate students and to make sure that they were happy and progressing in their research. I also teamed up my TAMU and UT students to help my team merge smoothly, to transfer the research experience from my senior students to the junior ones, and to avoid any possible interruption in my team's research developments.

Undergraduate Advising and Research Mentorship

I have been successful in attracting undergraduate students to research in the field of Formation Evaluation by bringing my research to the classroom. I have advised 8 undergraduate students (4 from UT Austin, 4 from TAMU) so far. I have published four conference papers with my undergraduate students.

Encouraging Undergraduate Students to Pursue Advanced Degrees: I have been successful in attracting undergraduate students who worked under my supervision to pursue advanced degrees. Among the 8 undergraduate students whom I advised, 4 have already graduated and all four decided to pursue graduate studies. Three of them joined my research team and one continued as a Ph.D. student at TAMU under the supervision of another faculty, upon my transition to UT Austin.

Building Confidence: An important point in undergraduate advising is to help students to gain confidence about their abilities to conduct research. In most of the cases, this confidence is what students need to decide to pursue advanced degrees. It was during my first year at UT Austin that I had a female undergraduate freshman visitor in my office, who wanted to do research in my team. She was a very shy student, talking very softly. I accepted her on my team, hoping that I can boost her confidence and help her to learn about Formation Evaluation. I suggested she start with basic well-log interpretation and at the same time do experimental work. I defined a simple fundamental project for her, helped her to start the project and to learn how to approach the problem, helped her to merge into my team and collaborate with my graduate students, and trained her to present her research. She later presented the outcomes of her research at an event organized by Women in Petroleum and Geosystems Engineering (WPGE) and received the best presentation award. During her final presentation, I found her a confident person who professionally presented and defended her research work and answered all the questions confidently and accurately. Such outcomes add abundant joy to my advising experience.

Advising Student Organizations

After I joined TAMU in 2011, I encouraged graduate and undergraduate students to initiate the SPWLA (Society of Petrophysicists and Well-Log Analysts) TAMU Student Chapter. This student organization was initiated in fall 2012, one year after I joined TAMU. I served as the faculty advisor for the SPWLA TAMU Student Chapter from 2012 to 2015. This student organization and its active contribution to SPWLA helped the petroleum engineering and geology and geophysics departments at TAMU become known as active departments in the field of petrophysics and well-log interpretation within the Society of Petrophysicists and Well-Log Analysts. I helped the students to organize monthly seminars, to create a website, to attract members, and get funding for their organization. After joining UT Austin, I have been supportive to the SPWLA UT Student Chapter, helped them in organizing an internal student paper contest in 2016, and helped them in inviting speakers for their seminar series.

**PGE Budget Council Statement
For
Zoya Heidari, Ph.D.**

Service to the University and to the Nation, State and Community

In the following, a succinct overview is given of Dr. Heidari's service to the University and Academia in general, and to the Nation, State and Community.

Service to University / Academia

During her time at Texas A&M University and more recently at The University of Texas at Austin, Dr. Heidari has shown herself to be a prominent and very active member of important committees at faculty and university/college level. Since her arrival in 2015 at UT Austin, her higher-than-average service involvement at the PGE department and at the college level has included:

- Chair of the Petrophysics Ph.D. Qualifying Exam Committee (2016 – 2017)
- Member of the Writing Ph.D. Qualifying Exam Committee (2016 – 2017)
- Member of the Graduate Admissions Committee (2016 – 2017)
- Member of the Faculty Search Committee (2015 – 2016)
- Member of the Graduate Committee (2015 – 2016)
- Member of the Women in Engineering Committee (2015 – 2017, college level)

This extensive recent service record follows an equally involved level of service, indicating that her recent service efforts continue a longer service trend, both at TAMU at the Harold Vance Department of Petroleum Engineering and at the TAMU university / college level:

- Chair of the Faculty Excellence Award Committee (2014 – 2015)
- Member of the Graduate Admissions Committee (2012 – 2014)
- Member of the Undergraduate Admissions Committee (2014 – 2015)
- Member of the Graduate Fellowship Committee (2012 – 2015)
- Member of the Faculty Excellence Award Committee (2012 – 2015),
- Member of the Awards Committee (2012 – 2014)
- Member of the Crisman Committee (spring 2015)
- Member of the Junior Faculty Advisory Committee (2014 – 2015, university level)
- Member of the Local Organizing Committee of the Society of Engineering Science (SES) Conference (college level)

Moreover, after joining TAMU in 2011, Dr. Heidari successfully encouraged graduate and undergraduate students to initiate the Society of Petrophysicists and Well-Log Analysts (SPWLA) TAMU Student Chapter in 2012. She served as its faculty advisor from 2012 to 2015 when she left for UT Austin. After joining UT, she has actively supported the SPWLA UT Student Chapter, helping them with organizing paper contests and arranging invited speakers for their seminar series. Her active involvement in promoting SPWLA at the universities where she has worked shows considerable maturity on her part to help students get relevant domain knowledge,

experience, exposure and opportunities outside of academia. This is fully consistent with the kind of service initiatives expected of an Associate Professor.

Service to the Nation, State and Community

In 2016, Dr. Heidari became the SPWLA Vice-President (VP) of Education, beating an experienced and well-recognized 10+ year industry petrophysicist for the nomination. She is currently serving a two-year term (2016 – 2018) as VP on the SPWLA board of directors to advance education of Formation Evaluation and Petrophysics through this important and prominent international society. Her responsibilities include (1) organizing and hosting monthly webinars, (2) organizing training courses related to Formation Evaluation, (3) extending SPWLA's support to universities to educate graduate- and undergraduate-level students, (4) initiating new forms of SPWLA student paper contests, including local- and international-level competitions to increase student engagement in the SPWLA activities, (e) organizing two topical conferences per year, (f) expanding modern and online education of Formation Evaluation in the SPWLA community. Clearly, these are very important tasks that will have a positive impact on the discipline of Petrophysics and Formation Evaluation and its global practitioners now and in the future.

Other activities undertaken by Dr. Heidari on behalf of SPWLA and similar industry organizations such as the Society of Petroleum Engineers (SPE), the Society of Exploration Geophysicists (SEG), etc., include:

- Member of the Technology Committee for the SPWLA Annual Symposium (2013 - 2016), with the usual responsibilities expected of such a member (ranking abstracts, technical programming for conferences, chairing technical sessions etc.)
- Member of the SPWLA Education Committee (2014 – 2016 as a member, 2016 – present as the chair of this committee)
- Member of the SPWLA Nomination Committee (2016 – 2017)
- Member of the SPWLA Publications Committee (2017 – present)
- Member of Steering Committees for SPWLA Topical Conferences on “Educating the Petrophysicist” and “Completion Petrophysics.”
- Member of the SPE Steering Committee for Unconventional Reserves Task Force Summit (2015)
- Chairing technical sessions in SPWLA, SEG, and URTeC (Unconventional Resources Technology) annual conferences

Clearly, the quantity of her many meaningful activities on behalf of SPWLA and other industry organizations is impressive and rivals that of some of the most active experts in both academia and industry concerned with outreach and service. In addition, she has served – and is continuing to serve – in a large variety of technical review and editorial functions:

- Technical reviewer and Associate Editor for Petrophysics Journal
- Technical reviewer for Geophysics Journal

- Technical reviewer for Interpretation Journal
- Technical reviewer and Associate Editor for SPE Reservoir Evaluation & Engineering Journal
- Technical reviewer for SPE Production and Operations Journal
- Technical reviewer for the Journal of Mathematical Geosciences.
- Review Panelist for the 2017 National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP)
- Technical reviewer for proposals submitted to the SPE Young Faculty Research Award (2015) program
- Technical reviewer for proposals submitted to the ACS-PRF (American Chemical Society-Petroleum Research Fund, 2014 and 2016) programs


It should be noted that all of these external committee, review and editing functions are on an invitation-basis only, underscoring that Dr. Heidari is highly regarded by the scientific community. Through these functions she has considerable impact on her field of expertise, e.g. by guaranteeing scientific rigor and excellence in the publications she peer-reviews. Moreover, it should be mentioned that Dr. Heidari has taken a special interest in encouraging high-/middle-school aged girls to pursue careers in energy-related STEM. Specific activities she has undertaken in this regard include organizing astronomy and physics workshops for middle-school girls, collaborating with the GirlTalk team from UT Austin in 2013, holding a workshop on “Symphony of Rocks and Fluids in the Subsurface” to introduce girls (in the levels of 5th-8th grade) to rock physics, well logging, petrophysics, and formation evaluation by conducting simple experiments, and participating in the “Expanding Your Horizons (EYH)” program at TAMU in 2014, where she and her graduate students presented a workshop for 6th-grade girls.


In conclusion, it is clear that Dr. Heidari’s service record, both inside and outside of academia, is excellent and completely in-line – and in many respects exceeding – what might be expected of an assistant professor. This statement is underpinned by strong support for her service record expressed in the letters of support by Dr. Michael King, Dr. Chandra Rai, and Dr. Russell Johns, the latter explicitly stating that *“overall, I find no issues with her service, and believe she has exceeded expectations in this area”*.


It is fully expected that Dr. Heidari will continue her trajectory of a combining a high quantity of service activities with a high quality of service in the future. In her service statement, she has expressed this very sentiment, and has already indicated how she plans to further expand her service activities, for instance by initiating a distance learning program for SPWLA to advance training and education of Formation Evaluation, and initiating a mentorship program for young professionals in Formation Evaluation through SPWLA.

Concluding Remarks

Based on an examination of the documents submitted, Dr. Heidari’s service record meets or exceeds the requirements for promotion.


Kamy Sepehroori, Chair
PGE Tenure and Promotion Committee


Mukul M. Sharma


Eric van Oort

Statement of Service to the University and to the Nation, State and Community

Zoya Heidari

My philosophy about service is that giving makes the world a better place to live for all of us and it helps me to grow as well. I owe my success to all who helped me voluntarily to learn, to persist, and to progress. I would like to do the same for others to initiate big changes in the world. Furthermore, I believe each and every service to the community and the professional societies is a learning opportunity and a great chance to meet and collaborate with others. My service opportunities can be summarized in three categories of (i) services to the university, (ii) services to the professional societies and organizations, and (iii) services to the community, which will be further described as follows. My goal and impact in all the following services is advancing education and research in the field of Formation Evaluation.

Services to the University

The University of Texas at Austin: At The University of Texas at Austin (UT Austin), I have served on the Petrophysics Ph.D. Qualifying Exam Committee as the chair of the committee (2016 – 2017), and as a member on the Writing Ph.D. Qualifying Exam Committee (2016 – 2017), the Graduate Admissions Committee (2016 – 2017), the Faculty Search Committee (2015 – 2016), and the Graduate Committee (2015 – 2016). I have also served on the Women in Engineering Committee as a member (2015 – 2017) at the college level.

Texas A&M University: At Texas A&M University (TAMU), I served on the Faculty Excellence Award Committee as the chair of the committee (2014 – 2015), and as a member on the Graduate Admissions Committee (2012 – 2014), the Undergraduate Admissions Committee (2014 – 2015), the Graduate Fellowship Committee (2012 – 2015), the Faculty Excellence Award Committee (2012 – 2015), the Awards Committee (2012 – 2014), and the Crisman Committee (spring 2015) in the Harold Vance Department of Petroleum Engineering. At the university level, I have served as a member on the Junior Faculty Advisory Committee (2014 – 2015) and the Local Organizing Committee of the Society of Engineering Science (SES) Conference, at the college level.

Student Organizations: After I joined TAMU in 2011, I encouraged graduate and undergraduate students to initiate the SPWLA (Society of Petrophysicists and Well-Log Analysts) TAMU Student Chapter. This student organization was initiated in fall 2012. I served as the faculty advisor for the SPWLA TAMU Student Chapter from 2012 to 2015. This student organization and its active contribution to SPWLA helped the petroleum engineering and geology and geophysics departments at TAMU become known as active departments in the field of petrophysics and well-log interpretation within the Society of Petrophysicists and Well-Log Analysts. After joining UT Austin, I have been supportive to the SPWLA UT Student Chapter, helped them in organizing an internal student paper contest, and helped them in inviting speakers for their seminar series.

Services to the Professional Societies and Organizations

The closest professional societies to my field of expertise include SPWLA (Society of Petrophysicists and Well-Log Analysts), SPE (Society of Petroleum Engineers), and SEG (Society of Exploration Geophysicists). The following paragraphs summarize my services and contributions to the aforementioned professional societies and organizations.

SPWLA Vice-President (VP) of Education: In 2015, I accepted the nomination as the SPWLA Vice-President (VP) of Education, because it was an opportunity for me to advance education of Formation Evaluation and Petrophysics worldwide through an international society. My competitor in the election was an experienced (13+ years of experience) and well-recognized petrophysicist from the industry. I was elected by SPWLA members in May 2016 to serve as the VP-Education on the board of directors for a two-year term (2016 – 2018). As the SPWLA VP of Education, I (a) organize and host monthly webinars, (b) organize training courses related to Formation Evaluation, (c) extend SPWLA's support to universities to educate graduate- and undergraduate-level students, (d) initiate a new form of SPWLA student paper contest, including local- and international-level competitions to increase student engagement in the SPWLA activities, (e) organize two topical conferences per year, (f) expand modern and online education of Formation Evaluation in the SPWLA community.

Other Services to the Professional Societies: I have also been actively engaged in many other professional services to SPWLA and SPE. I served as a member of the Technology Committee for the SPWLA Annual Symposium (2013 – 2016). In this role, I ranked the abstracts submitted for the annual symposium, participated in making decisions about the technical program for the annual symposium, assisted with the planning of technical workshops, prepared

proposals for technical workshops, chaired technical sessions, and helped in ranking the technical papers for selection of the best paper and poster at the annual symposium. I also served as a member on the SPWLA Education Committee (2014 – 2016 as a member, 2016 – present as the chair), SPWLA Nomination Committee (2016 – 2017), SPWLA Publications Committee (2017 – present), and the Steering Committees for the SPWLA Topical Conferences on “Educating the Petrophysicist” and “Completion Petrophysics.” I was invited by SPE to serve on the Steering Committee for the Unconventional Reserves Task Force Summit (2015). I have also chaired technical sessions in SPWLA, SEG, and URTEC (Unconventional Resources Technology) annual conferences. All the aforementioned services are considered as invitation-based services.

Technical Reviewer and Editor: I have served as a technical reviewer for the *Petrophysics* journal, the *Geophysics* journal, the *Interpretation* journal, the *SPE Reservoir Evaluation & Engineering* journal, the *SPE Production and Operations* journal, and the journal of *Mathematical Geosciences*. I recently accepted invitations from the *SPE Reservoir Evaluation & Engineering* journal, and the *Petrophysics* journal to serve as an associate editor. Both of these journals are among the most relevant to my field of expertise. I also served as a Review Panelist for the 2017 National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP) and a technical reviewer for proposals submitted to the SPE Young Faculty Research Award (2015) and the ACS-PRF (American Chemical Society-Petroleum Research Fund, 2014 and 2016) programs. All the aforementioned services are considered as invitation-based services.

Services to the Community

I am particularly interested in encouraging girls to pursue energy-related STEM (Science, technology, engineering, and mathematics) careers and motivating them strive to achieve their dreams. I started pursuing this passion right after entering university as an undergraduate student, when I organized astronomy and physics workshops for middle-school girls. I also had an enjoyable collaboration with the GirlTalk team from UT Austin in 2013. In this collaboration, I held a workshop on “Symphony of Rocks and Fluids in the Subsurface,” where I introduced girls (5th – 8th grade) to rock physics, well logging, petrophysics, and formation evaluation by conducting simple experiments. I later participated in a similar activity as part of the Expanding Your Horizons (EYH) program at TAMU in 2014, where my graduate students and I presented a workshop for 6th-grade girls (Figure 1).

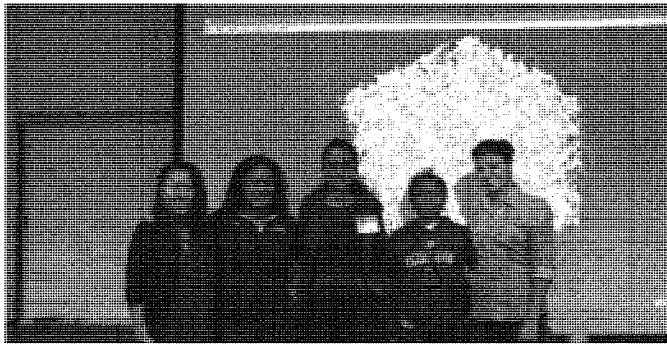
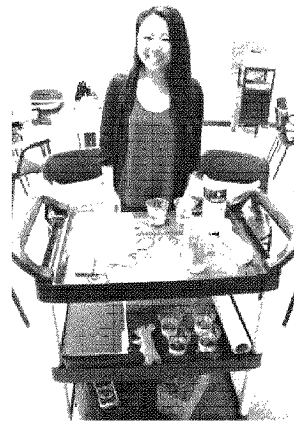


Figure 1: Four of my graduate students and I, holding a workshop entitled “Symphony of Rocks and Fluids in the Subsurface” during the 2014 Expanding Your Horizons (EYH) program, to encourage middle-school girls to pursue energy-related STEM careers.



Future Plans

I will continue contributing to professional societies such as SPWLA, SPE, and SEG, participating actively in departmental and university administrative committees, and serving the community. I plan to place emphasis of my services to the professional societies on two categories of editorial services and education. I will spend more time for my responsibilities as an associate editor for the *SPE Reservoir Evaluation & Engineering* journal and the *Petrophysics* journal. On the education side, I plan to initiate a distance learning program for SPWLA to advance training and education of Formation Evaluation. I also plan to initiate a mentorship program for young professionals in Formation Evaluation through SPWLA.

**PGE Budget Council Statement
For
Zoya Heidari, Ph.D.**

Honors and Other Evidence of Merit or Recognition, Including Contracts and Grants

Dr. Zoya Heidari has been very successful in attracting research funding from various governmental sources and oil and gas companies. The total amount of research funding she has brought in while at TAMU and UT Austin is \$9.49 million. Of this, her share is \$3.41 million (\$2.28 million as PI and \$1.13 million as Co-PI), with an additional \$2.31 million under current consideration / negotiation / review. In addition, she played an important role in securing \$12 million for the W.D. Gonten Rock Physics Laboratory for Unconventional Resources. Most of these grants were awarded while she was at TAMU. During her more recent time in Austin, she has been able to attract over \$198,910 dollars as her own share of funding while in rank as an assistant professor in the PGE department and was allowed to transfer (only) \$159,942 dollars from TAMU. Her funding comes from a diverse mix of funding sources, including industry consortia, competitive federal / foundation grants, external funding resources with internal UT competition, and external industry funding directly, either as PI or Co-PI. While at UT Austin, Dr. Heidari secured research funding from the Texas Oil and Gas Institute in addition to funds generated from her fledgling joint industry research consortium, a remarkable achievement in itself given the strong downturn in the petroleum industry after 2015 and the associated reluctance of industry sponsors to support academic R&D.

Her technical expertise is highly valued among her peers and she has served as a technical reviewer for several journals, including: Geophysics Journal, SEG Interpretation Journal, SPE Reservoir Evaluation & Engineering Journal, SPE Production and Operations Journal, Petrophysics Journal, and the Journal of Mathematical Geosciences. She is also:

- Publication committee member, nomination committee member, and member of the SPWLA Board of Directors as the Vice President (VP) of Education for the Society of Petrophysicists and Well Log Analysts (SPWLA),
- Review panelist for the 2017 NSF Graduate Research Fellowship Program (GRFP),
- Technical reviewer for the SPE Young Faculty Research Award proposals,
- Technical reviewer for ACS-PRF proposals of the American Chemical Society.

Dr. Heidari has been very active in (co-)organizing and supporting highly regarded technical conferences and workshops, including:

1. Reviewer for Society of Exploration Geologists (SEG) 87th Annual Conference and Exhibition, April 2017.
2. Co-organizer of two topical SPWLA conferences per year (conferences organized so far include: (1) The Role of Petrophysics in Plugging and Abandonment, 2016, November 7 – 8, Houston, Texas; (2) Value of Information and Uncertainty in Petrophysics, 2017, April 19 – 21, Bogota, Colombia).

3. Student paper judge for SPWLA during the annual international student paper contest, June 26, 2016.
4. Steering committee member for SPWLA, Unconventional Resources Special Interest Group (URSIG), September 2015 – Present.
5. Steering committee member for SPWLA, SPWLA Topical Conference on “Completion Petrophysics,” October 2015.
6. Steering committee member for Society of Petroleum Engineers (SPE), Unconventional Reserves Task Force Summit, March 2015 – December 2015.
7. Local organizing committee member for SPE, Society of Engineering Science (SES) Conference, Member of the Local Organizing Committee, September 2014 – October 2015.
8. Member of the Steering Committee for SPWLA Topical Conference on “Educating the Petrophysicist,” March 23 – 27, 2014.
9. Member of the Technology Committee for SPWLA Annual Symposium, July 2013 – July 2016.
10. Co-chair during Unconventional Resources Conference (URTeC), “Formation Evaluation of Unconventional Reservoirs” session, August 13, 2013.
11. Chair for Society of Exploration Geologists (SEG) 83rd Annual Conference and Exhibition, “Advances in Borehole Measurements and Interpretation” session, September 24, 2013.

Dr. Heidari has also presented numerous invited talks at technical meetings and universities worldwide, including Stanford University, The University of Tulsa and The University of Kansas as well as at industry companies including BHP Billiton, BP, Aramco Services Company, Occidental Petroleum Corporation, ConocoPhillips, Chevron, Halliburton, Weatherford, and Anadarko Petroleum Corporation.

Dr. Heidari’s honors are impressive. They include:

- 2012 Petroleum Engineer Junior Faculty Research Initiation Award from the Society of Petroleum Engineers (SPE – one of only six recipients of this prestigious award).
- 2014 TEES (Texas A&M Engineering Experiment Station) Select Young Faculty Fellows award at Texas A&M University (TAMU).
- 2014 SPWLA best poster award.
- 2014-2015 SPWLA distinguished presentation awards.
- 2015 SPE Innovative Teaching Award.
- 2016 SPE Regional Formation Evaluation Award from two regions (Southwest North America Region and the Gulf Coast North America Region).
- 2016-2017 Award of appreciation for service and outstanding accomplishment as the Vice-President of Education on the board of directors of SPWLA.
- 2017 SPE Cedric K. Ferguson Medal.

Note that Dr. Heidari is the first PGE faculty member and first PGE graduate to receive the highly prestigious Ferguson medal, which rewards excellence in research and associated publication for contributors under 36 years of age. This international award attests to the high quality of her research and publications.

Concluding Remarks

Based on an examination of the documents submitted, Dr. Heidari's honors record meets or exceeds the requirements for promotion.

Handwritten signature of Kamy Sepehri in cursive script.

Kamy Sepehri, Chair
PGE Tenure and Promotion Committee

Handwritten signature of Mukul M. Sharma in cursive script.

Mukul M. Sharma

Handwritten signature of Eric van Oort in cursive script.

Eric van Oort

Statement of Honors and other Evidence of Merit or Recognition

Zoya Heidari

Evidence of Academic or Professional Merit

Awards and Recognition: I am one of the six recipients of the prestigious 2012 Petroleum Engineer Junior Faculty Research Initiation Award from the Society of Petroleum Engineers (SPE). This award recognizes my excellence in commitment to academic research and student supervision. The acceptance rate for this award was approximately 6% in 2015, when I was a reviewer for the submitted applications/proposals.

I have also been awarded a research grant from the American Chemical Society (ACS) to accomplish a fundamental research project on formation evaluation of organic-rich mudrocks (shale). The acceptance rate for this award is often less than 20% and the applicants typically include junior faculty in chemical and petroleum engineering departments in the US.

In November 2014, I was announced as one of the recipients of the 2014 TEES (Texas A&M Engineering Experiment Station) Select Young Faculty Fellows award at Texas A&M University (TAMU). This award recognizes outstanding young faculty members who have demonstrated their talents for research. I was the first junior faculty from the Harold Vance Department of Petroleum Engineering who received this award since 1998. The applicants are typically nominated from all the engineering departments at Texas A&M University. The list of recipients of this award from 1998 – 2013 is attached.

I received the 2015 SPE Innovative Teaching Award. This award recognizes my excellence in commitment to academic research and student supervision and recognizes the important role that the academics of my caliber play in enhancing the educational environment of petroleum engineering departments and programs. Applicants/nominations for this award cover all the faculty members from the petroleum engineering departments in the world.

Furthermore, my students and I received the 2014 best poster presentation and three distinguished presentation awards (2014 and 2015) from the Society of Petrophysicists and Well Log Analysts (SPWLA), which made me and my students listed among the 2014 – 2015 and 2015 – 2016 distinguished presenters of SPWLA. Moreover, three of our 2017 SPWLA papers were ranked among the top ten papers of the 2017 SPWLA annual symposium. These recognitions were based on the peer reviews from the SPWLA Technical Committee (consists of approximately 20 – 40 members) among all the papers presented in the annual symposium (i.e., approximately 120 papers per year). The selection criteria include the technical content as well as the presentation skills.

I also received the 2016 SPE Regional Formation Evaluation Award from two regions, the Southwest North America Region and the Gulf Coast North America Region. These awards are an acknowledgement of my outstanding research, teaching, and service contribution in the field of Formation Evaluation at the regional level. Nominations for this award cover all the faculty members and industry experts in petroleum engineering from the aforementioned regions. I would like to emphasize that the majority of industry experts in Formation Evaluation are from the Southwest North America and the Gulf Coast North America regions.

I recently received an award of appreciation for service and outstanding accomplishment as the Vice-President of Education on the board of directors of SPWLA (2016 – 2017).

Finally and most importantly, I received the prestigious and highly competitive 2017 SPE Cedric K. Ferguson Medal, which recognizes my professional achievements in petroleum engineering. To the best of my knowledge, I am the first faculty member at the Department of Petroleum and Geosystems Engineering (PGE), who received this award while at UT Austin. I am also the first PGE graduate to receive this award. SPE considers all papers published in SPE journals in a given year by authors younger than 36 and presents the award for the best paper. Coauthors older than 36 receive the Cedric K. Ferguson Certificate. I was 34 in 2017 and received the Cedric K. Ferguson medal. This international award attests to the high quality of my research and publications from my team.

Invited Talks: I was invited to give graduate research seminars in peer institutions including Stanford University, The University of Tulsa, and The University of Kansas as well as to present my team's research achievements in well-known companies such as BHP Billiton, BP, Aramco Services Company, Occidental Petroleum Corporation, ConocoPhillips, Chevron, Halliburton, Weatherford, and Anadarko Petroleum Corporation.

I have also been invited to present at several workshops, webinars, and topical conferences. Examples include my presentations given at the Unconventional Resources Special Interest Group (URSIG), the Houston Geological Society (HGS) Applied Geoscience Conference, the SPWLA "Completion Petrophysics" workshop, the Society of Exploration Geophysicists (SEG) 2015 post-convention workshop W-10 "Physics of Rocks," the SPWLA local chapters, the SEG/SPE/AAPG/SPWLA/EAGE summer research workshop, the SEG workshop on "Integration of Petrophysics, Rock Physics, and Laboratory Measurements," and SPE webinars.

Contracts and Grants of an Honorific Nature: I was also one of the contributors in a multi-university and multi-disciplinary research grant "Advanced Computational and Numerical Modeling Techniques for Hydrocarbon Recovery," which received the Engineering Genesis (EG) award in 2015 and was recognized as one of the top TEES research awards for the year.

One of the research projects I have been proud of is my joint industry research program on "Multi-Scale Formation Evaluation of Unconventional and Carbonate Reservoirs" that I initiated and led from 2012 – 2015 at TAMU. This program had six industry members. I always received very encouraging comments from our industry sponsors. It is often believed that such programs should be initiated by senior faculty and I have always faced such mentality when approaching industry for promoting my program. I am proud of being successful in this path during the earliest stage of my career. After I joined UT Austin, I decided to revive that program at here. Although I started this program when the petroleum industry was experiencing a long-lasting downturn, I was successful in immediately attracting one major oil company, BP. Three other companies (i.e., Statoil, Baker Hughes, and Occidental Petroleum) are also considering joining this program in 2017. I will hold the first annual meeting of this new Industrial Affiliate Research Program on "Multi-scale rock physics" on August 16, 2017.

Election to Office in Scholarly or Professional Organizations: I have been elected by the members of the Society of Petrophysicists and Well Log Analysts (SPWLA) to serve on the board of directors as the Vice-President of Education from 2016 to 2018. I was first nominated by the SPWLA nomination committee to run for this position. My competitor in the election was an experienced (13+ year of experience) petrophysicist from the industry. Winning this election after a nomination process and competing against a well-known expert in the field of Formation Evaluation is an indication of me, being recognized among the SPWLA members as an impactful individual in the field of Formation Evaluation.

Fellowships: I have been the recipient of the Anadarko Petroleum Corporation Centennial Fellowship #1 in Petroleum Engineering from the Cockrell School of Engineering at The University of Texas at Austin (2016 – Present) and the Chevron Corporation Faculty Fellowship in Petroleum Engineering at Texas A&M University (December 2011 – August 2015). I have also received the 2016 SPE Faculty Enhancement Travel Grant from the Southwestern North America Region.

Other Honors: I have been invited to serve as an associate editor for the *Petrophysics* journal, the *SPE Reservoir Evaluation & Engineering* journal (Formation Evaluation), and the *Geophysics* journal, three of the most recognized journals in my field of expertise.

Success in Seeking and Obtaining External Funding and Diversity of Research Grants

Diversity and the Amount of Research Grants: Since starting my academic career as an assistant professor, I have acquired research funding of \$3,414,305 (My share, \$2,282,113 as the PI, \$1,132,192 as a Co-PI, out of a total research fund of \$9,490,449). I have been the first PI for 67% (\$2,282,113) and the sole PI for 56% (\$1,912,169) of my research funds. I have been successful in bringing research funding to support my team's research activities from diverse, competitive national and international funding resources. These funding resources can be classified into the following categories: my industry research consortia, individual projects with the petroleum industry, competitive federal/foundation grants, and external funding resources with internal competition. Table 1 summarizes the distribution of my research grants in different categories. Table 2 summarizes the level of competitiveness of my research grants within each category. Figure 1 shows the distribution of my research grants among different resources.

Individual Performance and Collaborative Efforts: My academic achievements have demonstrated that I strive to be independent in bringing external funds to my research group (I have been the first PI for 67% and the sole PI for 56% of my research funds), even in the most challenging stages of my career. However, it does not mean that I do not enjoy

research collaborations with others. I have served as a Co-PI in several collaborative projects with other petroleum engineers and geoscientists. The extensive support that I have received from the petroleum industry is great evidence for the direct application of my fundamental research to the challenges the petroleum industry faces today. My research fund distribution is a proof to these claims.

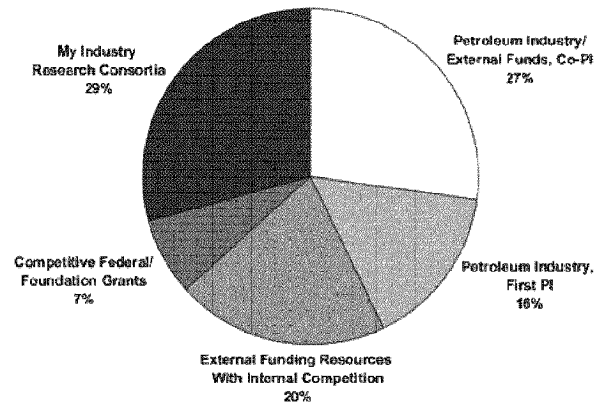


Figure 1: Distribution of my research grant (only my share) among different resources.

Table 1: Summary of the distribution of my research grants.

Resource Category	My Share (\$)	Total (\$)
Industry Research Consortia	1,000,000 ¹	1,000,000
Competitive Federal/Foundation Grants	253,485	1,037,111
External Funding Resources With Internal Competition	698,203	776,518
Petroleum Industry, First PI	533,910	578,910
Petroleum Industry/External Funds, Co-PI	928,707	6,097,910
Total	3,414,305	9,490,449

Table 2: The level of competitiveness of my research grants within each category.

Resource Category	Project/Sponsor	Level of Competitiveness
Industry Research Consortia	UT IAP	High, Competition among other JIPs and research centers in all the petroleum engineering departments in the world
	TAMU JIP	High, Competition among other JIPs and research centers in all the petroleum engineering departments in the world
Competitive Federal/Foundation Grants	Qatar National Research Foundation	High, Acceptance rate of approximately 15%
	American Chemical Society, ACS PRF	High, Acceptance rate of approximately 20%
	SPE Junior Faculty Research Initiation Award	High, Acceptance rate of approximately 6% in 2015, when I served as a reviewer
External Funding Resources With Internal Competition	Crisman Institute	Moderate, Through ranking from 10-20 companies whose main interests were typically not Formation Evaluation, Acceptance rate of approximately 30%
Petroleum Industry, First PI	Texas Oil and Gas Institute	High, Industry fund
	Saint-Gobain Proppants	High, Industry fund
Petroleum Industry/External Funds, Co-PI	PetroChina Tarim Oilfield Company	Not enough information to judge, Industry fund
	Acid Stimulation Research Program (ASRP)	Moderate, Similar to the case of Industry Research Consortia, but easier due to contributions from the senior faculty as Co-PIs
	Skoltech Center for Research	High, Competition among other top institutions in the US. Received the Engineering Genesis (EG) award in 2015 and was recognized as one of the top TEES research awards for the year.

¹ \$50,000 of this amount is pending paperwork/invoice. I expect to receive the funds in my account in August 2017.

LETTERS RECEIVED

Letters should be listed alphabetically by last name.

1 Name of reviewer, rank or title, department, university	Dr. Martin Blunt, Professor, Department of Earth Science and Engineering, Imperial College
Brief statement of expertise and reason for selection*	He is well known for his work in reservoir engineering, multiphase flow in permeable media, pore-scale modeling, and reservoir simulation. One of the top reservoir engineers in the world. Higher citations (18,523) and h-index (75) than any faculty in UT-PGE. Spent time as assistant professor at Stanford before going to Imperial. Peer school.
Other relevant information**	
Nominated by	Budget Council
Date letter received	July 7, 2017

2 Name of reviewer, rank or title, department, university	Dr. Christine Ehlig-Economides, NAE, Professor, Petroleum Engineering, University of Houston
Brief statement of expertise and reason for selection*	Formation evaluation and reservoir engineering expert, widely recognized for her work on well testing and reservoir characterization. NAE.
Other relevant information**	Overlapped with Heidari at A&M for 1.5 years until Economides left for Houston - did not collaborate – should be considered as arm's length.
Nominated by	Candidate
Date letter received	June 25, 2017

3 Name of reviewer, rank or title, department, university	Dr. Roland Home, NAE, Professor, Department of Energy Resources Engineering, Stanford University
Brief statement of expertise and reason for selection*	Expert in reservoir engineering and characterization, NAE, former Stanford Department chair. Peer school and program (our greatest competition for recruiting the best graduate students and graduate program rankings – we are #1, Stanford is #2).
Other relevant information**	
Nominated by	Budget Council
Date letter received	July 12, 2017

4 Name of reviewer, rank or title, department, university	Dr. Russell Johns, Professor, Willie Leone Family Department of Energy and Mineral Engineering, Program Chair for Petroleum and Natural Gas Engineering, Penn State University
Brief statement of expertise and reason for selection*	Expert in the areas of phase behavior, well testing, enhanced oil recovery, and reservoir engineering. Peer school.
Other relevant information**	Former UT-PGE Professor, no collaboration with candidate, should be considered arm's length.
Nominated by	Budget council
Date letter received	July 5, 2017

*Provide additional detail for any reviewer not at a peer institution

** Provide explanation for any reviewer not at arm's length.

5 Name of reviewer, rank or title, department, university	Dr. Mike King, Professor, Petroleum Engineering, Texas A&M University
Brief statement of expertise and reason for selection*	He has done extensive work in the area of reservoir characterization, upscaling of geologic models for flow simulation, and streamline-based simulation. Peer school and program (A&M ranked #3 for graduate petroleum engineering)
Other relevant information**	Overlapped with Heidari at A&M for 4 years but did not collaborate – should be considered as arm's length.
Nominated by	Candidate
Date letter received	July 7, 2017

6 Name of reviewer, rank or title, department, university	Dr. Rosemary Knight, Professor, Department of Geophysics, Stanford University
Brief statement of expertise and reason for selection*	She is an expert in the area of geophysical imaging for environmental application and the use of electromagnetic methods for exploring the properties and processes that control the distribution and movement of water in the subsurface. Her expertise closely matches Heidari. Peer school and program.
Other relevant information**	
Nominated by	Candidate
Date letter received	July 23, 2017

7 Name of reviewer, rank or title, department, university	Dr. Erdal Ozkan, Professor and Department chair, Dept. of Petroleum Engineering, Colorado School of Mines
Brief statement of expertise and reason for selection*	He is well known for his work on well testing, fluid flow in porous media, well performance evaluation, and naturally fractured reservoir modeling. Peer school.
Other relevant information**	
Nominated by	Budget Council
Date letter received	July 6, 2017

8 Name of reviewer, rank or title, department, university	Dr. Chandra Rai, Professor and Department chair, Petroleum and Geological Engineering, University of Oklahoma
Brief statement of expertise and reason for selection*	He is an expert in rock and mineral physics, reservoir characterization, and petrophysics. Peer school.
Other relevant information**	
Nominated by	Budget Council
Date letter received	July 6, 2017

*Provide additional detail for any reviewer not at a peer institution

** Provide explanation for any reviewer not at arm's length.

DECLINATIONS

Those declining to provide a review letter should be listed *alphabetically* by last name.

1 Name of reviewer, rank or title, department, university	Dr. Robert Kleinberg, NAE, Research Fellow, Schlumberger-Doll Research
Brief statement of expertise and reason for selection*	One of the leading scientists in formation evaluation, magnetic resonance and dielectric measurements of rocks, and a pioneer on novel ways to assess properties of organic mudrocks in-situ.
Other relevant information**	
Nominated by	Budget Council
Declination – date received and reason	July 4, 2017. Declined because was no longer active in field of candidate, felt was insufficiently up to date with technology.
2 Name of reviewer, rank or title, department, university	Dr. Albert Reynolds, NAE, Professor, McDougall School of Petroleum Engineering, Tulsa University
Brief statement of expertise and reason for selection*	Well known for his work in the areas of reservoir characterization, well testing, history matching, stochastic optimization, ensemble Kalman filter, and production optimization.
Other relevant information**	
Nominated by	Candidate
Declination – date received and reason	June 18, 2017 – unavailable because of 3 week family vacation.

NO RESPONSE

Those not responding to the request to provide a review letter should be listed *alphabetically* by last name.

1 Name of reviewer, rank or title, department, university	Harold Vinegar, NAE, Professor, Department of Geological and Environmental Sciences, Ben-Gurion University of the Negev
Brief statement of expertise and reason for selection*	Dr. Vinegar is a leading expert in formation evaluation, rock core analysis, and fluid flow in porous media. Closely aligned with Heidari's field. NAE. Collaborated with PGE faculty (not Heidari) in the past when at Shell-Houston.
Other relevant information**	May have moved to different university so possible we didn't have his proper contact information.
Nominated by	Budget Council

*Provide additional detail for any reviewer not at a peer institution

** Provide explanation for any reviewer not at arm's length.



DEPARTMENT OF PETROLEUM AND GEOSYSTEMS ENGINEERING
THE UNIVERSITY OF TEXAS AT AUSTIN

CPE 2.502 • Austin, Texas 78712 • (512) 471-3161 • Telefax (512) 471-9605

June 15, 2017

Dr. Roland Horne
Professor
Department of Energy Resources Engineering
Stanford University
Roland.Horne@stanford.edu

Dear Dr. Horne:

The Department of Petroleum & Geosystems Engineering at The University of Texas at Austin is considering Assistant Professor Zoya Heidari for tenure and for advancement in rank to the position of Associate Professor. We would appreciate your candid assessment of her scholarly contributions to assist our decision-making process. Excellent teaching is an important criterion for promotion, but our evaluation of teaching is being carried out separately, and we are asking you only for information about her scholarly distinction. Copies of Dr. Heidari's curriculum vitae and several recent papers are enclosed for your review, as well as a brief research statement.

UT Austin normally considers a faculty member for promotion to associate professor upon completion of five years in probationary status as an assistant professor. However, Dr. Heidari had completed four years as an assistant professor at Texas A&M University prior to joining UT Austin in September 2015, and per school policy, she was required to complete at least two but no more than 5 years in residence at UT-Austin before going up for promotion. Under these circumstances, the criteria for promotion and tenure are no different than for faculty whose tenure clock has not been extended. We therefore request that this situation not be a factor in your letter of evaluation.

For Your Letter: We would appreciate your opinions regarding Dr. Heidari's major engineering and/or scientific contributions. In preparing your assessment, please consider the following questions, as well as including any other factors you deem salient:

1. Do you know Dr. Heidari, and if so, for how long and under what circumstances?
2. What are the original, innovative, and/or important contributions that he has made in her field of research? Have her publications influenced the thinking of, or the methods used by, you or others in your field?
3. How would you assess Dr. Heidari's development compared with others in her cohort at research-intensive universities?
4. What is your perspective on Dr. Heidari's promise for further professional growth and leadership?

We would be grateful for any additional comments you might have. The more specific you can be in your comments, the more helpful your evaluation will be.

Under the laws of the State of Texas, Dr. Heidari has the right to request to see any materials in her personnel file, including your letter. Members of our faculty and internal review committees who see your letter as part of the promotion process will hold the comments you make in confidence, however.

Deadline: We would like to receive a signed letter from you by July 7, 2017. If this date is a problem, please contact me as soon as possible as we want to do everything we can to enable you to provide us with an evaluation. It is not necessary for you to send us a hard copy of your letter - an electronic or scanned version is sufficient, provided your institutional letterhead and your signature are included. In addition, please enclose a copy of a short version of your curriculum vitae or résumé (preferably no longer than two pages). If you have questions, please call me at the number given on the letterhead.

Thank you for your time and assistance with this important matter. I realize that the amount of time required to do a thoughtful review is considerable.

Sincerely,

A handwritten signature in black ink, appearing to read "Jon E. Olson".

Jon E. Olson, PhD, PE
Chairman and Frank W. Jessen Professor
The Lois and Richard D. Folger Leadership Chair

From: Olson, Jon
Sent: Saturday, June 17, 2017 10:45 PM
To: Roland.Horne@stanford.edu
Cc: Olson, Jon; Stickney, Stephanie
Subject: Promotion Letter Request, Zoya Heidari

**I'm resending this message as some people reported trouble with the zip file. The 5 significant papers can be downloaded from this link:
https://www.dropbox.com/sh/scsqexs5wk2nzs5/AADhOcL4F_6G2CtpOJKvagta?dl=0

Dear Roland – It was good talking to you on the phone the other day. Thanks for being willing to help us in our tenure/promotion process. As you know, the academic promotion process depends heavily on the role of outside, impartial evaluators. I have attached a letter requesting you to evaluate the promotion dossier of one of our assistant professors, Zoya Heidari. I have also attached her CV, 5 significant papers, and a brief research statement by Dr. Heidari.

The deadline we are requesting for receiving your letter is July 7.

Thanks so much for your time and consideration.

-Jon

Hook 'em!

Jon E. Olson, Chair and Frank W. Jessen Professor
Lois K. and Richard D. Folger Leadership Chair
The University of Texas at Austin | Petroleum and Geosystems
Engineering | 512-471-7375 | www.pge.utexas.edu

Zoya Heidari – Materials Sent to Reviewers

- 1) CV
- 2) Research summary
- 3) Five significant publications

List of the Five Most Significant Works

Zoya Heidari

1. Chi^{6*}, L. and Heidari, Z. 2015. Diffusional Coupling between Microfractures and Pore Structure and its Impact on Nuclear Magnetic Resonance Measurements in Multi-Porosity Systems. *Geophysics* **80** (1): D31 – D42. DOI: 10.1190/geo2013-0467.1
2. Yang*, A., Firdaus*, G., and Heidari, Z. 2016. Electrical Resistivity and Chemical Properties of Kerogen Isolated from Organic-Rich Mudrocks. *Geophysics* **81** (6): D643 – D655. DOI: 10.1190/geo2016-0071.1
3. Chi*, L., Cheng*, K., and Heidari, Z. 2016. Improved Assessment of Interconnected Porosity in Multiple-Porosity Rocks by Use of Nanoparticle Contrast Agents and Nuclear-Magnetic-Resonance Relaxation Measurements. *SPE Reservoir Evaluation & Engineering Journal, Formation Evaluation* **19** (1): 95 – 107. DOI: 10.2118/170792-PA
4. Chi*, L. and Heidari, Z. 2016. Directional-Permeability Assessment in Formations with Complex Pore Geometry with a New Nuclear-Magnetic-Resonance-Based Permeability Model. *SPE Journal* **21** (4): 1436 – 1449. DOI: 10.2118/179734-PA
5. Chen*, H. and Heidari, Z. 2016. Pore-Scale Joint Evaluation of Dielectric Permittivity and Electrical Resistivity for Assessment of Hydrocarbon Saturation Using Numerical Simulations. *SPE Journal* **21** (6): 1930 – 1942. DOI: 10.2118/170973-PA

⁶ * Indicates graduate students under my supervision

Summary of Research Accomplishments, Direction, and Impacts

Zoya Heidari

My research focuses on fundamental research on Multi-Scale Formation Evaluation and Petrophysics. The impact of my work is on improved description of multi-phase fluid transport in spatially complex reservoirs, such as carbonates and organic-rich mudrocks, with the intent to enhance production and recovery factors in these reservoirs. The main contributions stemming from my research are the following:

1. **Fundamental experimental and computational research** in rock physics to quantify physics of unconventional reservoirs and rocks with complex pore/matrix geometry.

An example of my fundamental experimental research is quantifying physical properties of pure kerogen (e.g., electrical and mechanical properties), which affect borehole geophysical measurements as well as core measurements. These properties can be significantly affected by thermal maturity. For instance, low electrical resistivity measurements in organic-rich mudrocks are commonplace in highly mature depth intervals. These low resistivity values are usually difficult to justify and lead to overestimation of water saturation when using conventional resistivity-porosity-saturation models (e.g., dual water and Waxman-Smiths). The electrical conductivity of kerogen increases when it thermally matures, due to graphitization and increase in its aromaticity. This phenomenon can contribute to low resistivity measurements in organic-rich mudrocks. Experimental quantification of electrical properties of pure kerogen is, however, challenging. The following paper (Paper 2) is an example of my **fundamental experimental research** in quantifying electrical conductivity of kerogen as a function of thermal maturity through combined experimental and numerical approaches:

Yang^{*1}, A., Firdaus*, G., and Heidari, Z. 2016. Electrical and Chemical Properties of Kerogen Isolated from Organic-Rich Mudrocks. *Geophysics* **81** (6): D643 – D655. DOI: 10.1190/geo2016-0071.1

I also have publications documenting other properties of pure kerogen such as dielectric constant and elastic properties as a function of thermal maturity. Reliable quantification of these properties improve interpretation of geophysical measurements for assessment of hydrocarbon reserves or mechanical properties of organic-rich mudrocks.

The following paper (Paper 1) includes an example of my **fundamental computational research** in the field of Nuclear Magnetic Resonance (NMR) measurements:

Chi*, L. and Heidari, Z. 2015. Diffusional Coupling between Microfractures and Pore Structure and its Impact on Nuclear Magnetic Resonance Measurements in Multi-Porosity Systems. *Geophysics* **80** (1): D31 – D42. DOI: 10.1190/geo2013-0467.1

In this paper, I use numerical modeling to quantify the impact of microfractures/channels on NMR measurements and to propose the concept of fracture-pore diffusional coupling in such heterogeneous systems. This paper also documents a simplified 1D analytical model for fracture-pore diffusional coupling. The results are promising for future applications of NMR relaxometry for the assessment of microfracture content, when combined with other conventional well logs.

2. Develop new **physics-based models** and **experimental techniques** for formation evaluation of reservoirs with complex rock physics and for integration of multi-scale formation data.

Conventional petrophysical models for interpretation of borehole geophysical measurements are often not reliable in the presence of complex pore/matrix geometry, fractures, and complex rock composition. The following publication (Paper 3) is an example of the **experimental techniques** I developed for improved formation evaluation of complex

¹ * Indicates graduate students under my supervision

reservoirs. In this paper, I introduce the application of nanoparticle contrast agents to improve assessment of interconnected porosity and fracture network using NMR measurements. The combined interpretation of NMR relaxometry data before and after nanoparticle injection enables distinguishing connected and isolated pore volumes, which might not be possible in the absence of contrast agents.

Chi*, L., Cheng*, K., and Heidari, Z. 2016. Improved Assessment of Interconnected Porosity in Multiple-Porosity Rocks by Use of Nanoparticle Contrast Agents and Nuclear-Magnetic-Resonance Relaxation Measurements. *SPE Reservoir Evaluation & Engineering Journal, Formation Evaluation* **19** (1): 95 – 107. DOI: 10.2118/170792-PA

The following publication (Paper 5) is an example of my research on developing **physics-based analytical models**, which accounts for spatial distribution of rock components (e.g., pore and pyrite networks) through integration of dielectric permittivity and electrical resistivity measurements to improve assessment of hydrocarbon saturation.

Chen*, H. and Heidari, Z. 2016. Pore-Scale Joint Evaluation of Dielectric Permittivity and Electrical Resistivity for Assessment of Hydrocarbon Saturation Using Numerical Simulations. *SPE Journal* **21** (6): 1930 – 1942. DOI: 10.2118/170973-PA

3. Quantitatively account for **rock fabric (i.e., spatial distribution of rock components) and **pore network geometry** in the interpretation of rock physical properties for reliable formation evaluation.**

Rock fabric significantly affects physical properties of formations. However, this influence is often not quantitatively taken into account in interpretation of formation data (e.g., borehole geophysical measurements). My research contributes to developing new techniques for quantifying rock fabric (i.e., spatial distribution and connectivity of different rock components) using multi-scale imaging and incorporating it in interpretation of formation data such as electromagnetic and NMR measurements. For instance, the following paper (Paper 4) documents a new method that incorporates directional pore-connectivity factor in interpretation of NMR measurements and enables assessment of permeability tensor. The pore-connectivity factor is estimated using actual pore-network structure from pore-scale images in each given rock type in the formation.

Chi*, L. and Heidari, Z. 2016. Directional-Permeability Assessment in Formations with Complex Pore Geometry With a New Nuclear-Magnetic-Resonance-Based Permeability Model. *SPE Journal* **21** (4): 1436 – 1449. DOI: 10.2118/179734-PA

My research has also led to development of other petrophysical models, which quantitatively account for spatial distribution of rock components for interpretation of electrical measurements (i.e., electrical conductivity and dielectric permittivity). Such approach enables minimizing calibration efforts by honoring the realistic physics of rocks.

4. Develop new **completion petrophysics techniques.**

One of the objectives of developing the aforementioned new methods for interpretation and integration of multi-scale formation data is to enhance production and recovery factors in complex reservoirs. Thus, completion petrophysics is one of the research areas that I have eagerly invested on and plan to expand. Examples of my research accomplishments in this multi-disciplinary research area include development of integrated rock classification methods that accounts for stress profile as well as development of new techniques for quantifying proppant damage through acoustic and NMR measurements.

Imperial College
London

Department of Earth Science and Engineering
Imperial College London

BC

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Tel: +44 (0)20 7594 6500 Fax: +44 (0)20 7594 7444
m.blunt@imperial.ac.uk
www.ese.ic.ac.uk/homepage.php?StaffID=40

07 July 2017

Martin Blunt MA PhD
Professor of Petroleum Engineering

Jon E. Olson, PhD, PE
Chairman and Frank W. Jessen Professor
The Lois and Richard D. Folger Leadership Chair
University of Texas at Austin

Letter of Recommendation for Dr. Zoya Heidari

I am pleased to have the opportunity to write a letter in support of Dr. Heidari's promotion to Associate Professor with tenure. I do not know Dr. Heidari personally, but I am aware of her work and have read several of her papers; I have also read the five papers provided with her CV.

Dr. Heidari's research is principally concerned with the characterization of complex hydrocarbon rocks, namely carbonates and shale, over a range of length scales. This work is extremely important as it focusses on one of the principal problems in the oil and gas industry, which is how to extract, efficiently, hydrocarbon from unconventional resources. She has founded a joint industry programme on this topic, which has been extremely successful in terms of funds raised, student support and publications.

Whereas the oil industry has a long experience with production from sandstone and relatively simple carbonate formations developing a suite of analysis tools and correlations around this, production from unconvensionals is much more recent, and it is apparent that the conventional approaches that we have used to date to characterize and develop these resources are inadequate. What is needed are a new set of tools with a sound physical basis for the evaluation of shales and other complex rocks.

Dr. Heidari has pioneered new methods to characterize hydrocarbon-bearing shales, described in a series of excellent papers in the petroleum engineering literature. These methods enable the permeability, pore structure and amount of oil to be quantified. She has used NMR, in combination with the use of nanoparticles, to study the connectivity of the pore space of shales, including the impact of micro-fractures. In addition, she has used this work to develop a directional permeability model. She has also studied the electrical properties of shale, which should allow a more accurate and robust assessment of oil saturation. All of this research is practically significant, as it allows the amount of oil in place to be assessed together with its ability to flow.

She has worked with a good group of students and is likely to continue to make significant discoveries in the coming years. Of particular interest is the combination of different methods and approaches, such as NMR, nanoparticles and numerical modelling to quantify the flow potential of shale.

Overall her publications record is good with 31 journal papers listed on her CV and a large number of conference presentations. My only advice would be for her to consider aiming to publish some work in higher-profile or more general journals with a broader readership: at present most papers are published in somewhat specialist petroleum publications. I also note an excellent record of teaching and supervision with several graduated PhD students.

Despite its importance, the number of good junior researchers working in this area is small, so there is not a large peer group with which to compare her. However, I will say that her research is of good quality and consistent with tenured positions at the best universities in the world.

I consider that she has the capability and experience to make major contributions to petroleum engineering, flow in porous media and the understanding of unconventional oil and gas production. I consider that promotion with tenure is fully justified.

Yours sincerely,

A handwritten signature in black ink that reads "Martin Blunt". The signature is written in a cursive, flowing style.

Prof. M J Blunt
Professor of Petroleum Engineering
Imperial College London

Tuesday, September 5, 2017 at 9:56:58 AM Central Daylight Time

Subject: RE: Promotion Letter Request, Zoya Heidari

Date: Monday, July 24, 2017 at 3:59:24 AM Central Daylight Time

From: Blunt, Martin J

To: Stickney, Stephanie

Dear Stephanie,

Here it is – please let me know if you require anything else.

Best wishes,

Martin

Martin Blunt
Shell Professor of Reservoir Engineering
Editor-in-Chief *Transport in Porous Media*
Visiting Professor, Politecnico di Milano
Department of Earth Science and Engineering
Imperial College
London SW7 2AZ

From: Stickney, Stephanie [mailto:stickney@austin.utexas.edu]

Sent: 21 July 2017 22:26

To: Blunt, Martin J <m.blunt@imperial.ac.uk>

Cc: Olson, Jon <jolson@austin.utexas.edu>; Stickney, Stephanie <stickney@austin.utexas.edu>

Subject: Promotion Letter Request, Zoya Heidari

Hi Martin,

Thank you very much for your letter of recommendation. As part of the promotion process we need the C.V.s of the letter writers. Could you please send me your C.V. at your earliest convenience?

Gratefully,

STEPHANIE STICKNEY, Executive Assistant
The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-1210 | www.pge.utexas.edu

From: Blunt, Martin J [mailto:m.blunt@imperial.ac.uk]

Sent: Friday, July 07, 2017 3:49 AM

To: Olson, Jon <jolson@austin.utexas.edu>

Subject: RE: Promotion Letter Request, Zoya Heidari

Dear Jon,

I attach my letter of recommendation.

Best wishes,

Martin

Page 1 of 2

Martin Blunt
Shell Professor of Reservoir Engineering
Editor-in-Chief *Transport in Porous Media*
Visiting Professor, Politecnico di Milano
Department of Earth Science and Engineering
Imperial College
London SW7 2AZ

From: Olson, Jon [<mailto:jolson@austin.utexas.edu>]
Sent: 23 June 2017 06:44
To: Blunt, Martin J <m.blunt@imperial.ac.uk>
Cc: Stickney, Stephanie <stickney@austin.utexas.edu>
Subject: RE: Promotion Letter Request, Zoya Heidari

Hi Martin – Please find attached Zoya’s CV. I hope you will be able to help us out. -Jon

Hook ‘em!

Jon E. Olson, Chair and Frank W. Jessen Professor
Lois K. and Richard D. Folger Leadership Chair
The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-7375 | www.pge.utexas.edu

From: Olson, Jon
Sent: Saturday, June 17, 2017 7:02 PM
To: m.blunt@imperial.ac.uk
Cc: Olson, Jon <jolson@austin.utexas.edu>; Stickney, Stephanie <stickney@austin.utexas.edu>
Subject: Promotion Letter Request, Zoya Heidari

Dear Martin - I have attached a letter requesting you to evaluate the promotion dossier of one of our assistant professors, Zoya Heidari. I have also attached her CV, 5 significant papers, and a brief research statement by Dr. Heidari.

As you know, the academic promotion process depends heavily on the role of outside, impartial evaluators. I hope we can count on you to help.

Please respond to this email as soon as is convenient as to whether you can do this evaluation. Assuming you are willing to participate, the deadline we are requesting for receiving your letter is July 7.

Thanks so much for your time and consideration.

-Jon

Hook ‘em!

Jon E. Olson, Chair and Frank W. Jessen Professor
Lois K. and Richard D. Folger Leadership Chair
The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-7375 | www.pge.utexas.edu

Martin J. Blunt

Professor of Petroleum Engineering
 Department of Earth Science & Engineering
 Imperial College London
 London SW7 2AZ, UK
 Tel. +44(0) 20 75946500
 Fax +44(0) 20 75947444
 E-mail: m.blunt@imperial.ac.uk

Education

1985 BA Natural Sciences, Cambridge University (First Class Honours)
 1988 PhD, Theoretical Physics, Cambridge University.
 "The Growth and Properties of Fractal Boundaries."

Employment

1988-1992 Research Physicist, BP Research, Sunbury-on-Thames
 1992-1999 Faculty member, Department of Petroleum Engineering, Stanford University: Assistant Professor 1992-1995; Associate Professor 1995-1999; sabbatical at Imperial College 1998-1999.
 1999-date Professor at Imperial College London: Head of the Petroleum Engineering and Rock Mechanics research group (PERM) 1999-2006; Head of the Department of Earth Science and Engineering 2006-2011.
 2012-date Visiting Professor, Politecnico di Milano
 2016-date Shell Professor of Reservoir Engineering

Honours and Awards

1985 Research Scholarship, Trinity College Cambridge
 1985 Clerk Maxwell and ver Heyden de Lancey Prizes, Cambridge University
 1991 Tallow Chandlers Prize, BP
 1996 Teaching award, School of Earth Sciences, Stanford University
 1996 Cedric Ferguson Medal, Society of Petroleum Engineers
 2001 Distinguished Lecturer, Society of Petroleum Engineers
 2011 Lester Uren Award and Distinguished Member, Society of Petroleum Engineers
 2012 Darcy Award from the Society of Core Analysts
 2016 President's Medal for Excellence in Teaching
 2017 Erasmus Award from the European Association of Geoscientists and Engineers

Martin Blunt joined Imperial in June 1999 as a Professor of Petroleum Engineering. He served as Head of the Department of Earth Science and Engineering from 2006-2011. Previous to this he was Associate Professor of Petroleum Engineering at Stanford University in California. Before joining Stanford in 1992, he was a research reservoir engineer with BP in Sunbury-on-Thames. He holds MA and PhD (1988) degrees in theoretical physics from Cambridge University. Professor Blunt's research interests are in multiphase flow in porous media with applications to geological carbon storage, oil and gas recovery, and contaminant transport and clean-up in polluted aquifers. He performs experimental, theoretical and numerical research into many aspects of flow and transport in porous systems, including pore-scale modelling of displacement processes, and large-scale simulation using streamline-based methods.

Some of his main activities are listed below.

1. **Teaching at Imperial.** Prof. Blunt teaches two undergraduate classes, Hydrogeology and Fluid Flow, parts 1 and 2. He also teaches Reservoir Engineering for the MScs in Petroleum Engineering, Petroleum Geoscience, and Metals and Energy Finance: he teaches and examines all 130-plus MSc students each year. He consistently receives excellent teaching evaluations and was awarded the 2016 President's Medal for Excellence in Teaching.
2. **Other teaching activities.** He also teaches a course in Petroleum Engineering to MSc students at Politecnico di Milano, where he is a visiting professor, and short courses to industry, based on material developed at Imperial College. He has also recently completed a book entitled "Multiphase Flow in Permeable Media: A Pore-Scale Perspective" to be published in 2017 by Cambridge University Press. The content is based on advanced undergraduate classes taught at Imperial.
3. **Administration.** Prof Blunt is Director of the MSc in Petroleum Engineering, and Director of the Qatar Carbonates and Carbon Storage Research Centre a 10-year (2008-2018), \$70 million cross-departmental research activity: it is the largest single research programme at Imperial College.
4. **Research.** Prof. Blunt has over 200 publications which have received over 18,000 citations with an h-index of 70 (Google Scholar). He supervises and co-supervises 15 PhD students and 4 post-docs. His research group have recently developed a unique experimental facility to image, at representative reservoir conditions of temperature and pressure, pore-scale fluid distributions, complemented by a suite of modelling and analysis tools.
5. **He is Editor-in-Chief of the scientific journal Transport in Porous Media.**
6. **External activities.** In 2013 Prof. Bunt served as Principal Expert Witness for BP in Phase 2 of the Deepwater Horizon Trial in New Orleans. This was part of BP's legal battles, specifically a civil trial to determine fines under the Clean Water Act. Prof. Blunt's role was to determine the amount of oil spilled in the Deepwater Horizon accident: to do this he used material balance, the method that he also teaches to all his MSc students. He succeeded in explaining basic petroleum engineering concepts to a judge with no scientific training!
7. **Entrepreneurship.** Prof Blunt has co-founded two start-up companies. The first, Streamsim Technologies, was spun out of Stanford University in 1996; the second was established in 2010 by a former Imperial PhD student, Hu Dong, and is based in Beijing. The company, iRock Technologies, applies many of the imaging and modelling concepts developed at Imperial to provide a commercial service to the oil industry. Prof. Blunt is Chief Scientist.

UNIVERSITY of HOUSTON

C

CULLEN COLLEGE of ENGINEERING

Petroleum Engineering

June 25, 2017

Dr. Jon Olson, Chairman and Frank W. Jessen professor
The Lois and Richard D. Folger Leadership Chair
Department of Petroleum and Geosystems Engineering
The University of Texas at Austin
CPE 2.502
Austin, TX 78712

RE: Reference Letter for Dr. Zoya Heidari

I am currently the Professor and Hugh Roy and Lillie Cranz Cullen Distinguished University Chair in Petroleum Engineering faculty at the University of Houston. Before that I was Professor and Albert B. Stevens Endowed Chair, Petroleum Engineering Dept., Texas A&M University (TAMU). Before that I worked 20 years for Schlumberger. While at TAMU I managed research in production and reservoir engineering in conventional and shale reservoirs and helped the petroleum engineering department to grow and evolve to a broader energy scope. I was elected to the National Academy of Engineering in 2003, and have been a member of the National Academy of Science Committee on America's Energy Future, and the NRC Board on Energy and Environmental Systems (BEES). I am currently a member of the Advisory Board for the Petroleum Research Fund managed by the American Chemical Society. I am one of the 16 Quantum Reservoir Impact (QRI) Scholars and was named a Chief Scientist for the Sinopec Research Institute on Petroleum Engineering as one of the Thousand Talents in China. I have a PhD in petroleum engineering from Stanford University, an M.S. in chemical engineering from the University of Kansas and a B.A. in Math-Science from Rice University.

I have known Dr. Zoya Heidari since she arrived at TAMU in the fall of 2012 and have served as her faculty mentor. I still recall what happened when Dr. Heidari arrived about 2 weeks after classes had started and just after she had successfully defended her dissertation. As a result of a miscommunication one of the full professors thought she was arriving sooner and that she would be starting his class in his absence. Suddenly she was confronted with teaching a course with no advance notice that this would be required. The following semester Dr. Heidari was asked to teach another different class, this time with nearly 200 students. Both of these experiences would be extraordinary anywhere, and certainly Dr. Heidari was a bit intimidated by them. However, in both cases she successfully took the challenge. I remember she was worried during the spring semester that she had not attracted research funding yet. No wonder when she was having to manage multiple lab sections, TAs, graders, and so many students. By fall of 2015, just a few months later, she had her first Joint Industry Research Program involving 6 major operating companies with \$900K funding.

Dr. Heidari's experimental and computational work to quantify the physics of unconventional reservoirs is of highest importance for the petroleum industry, and it is easy to see why she has been successful in attracting funding for this work. Organic rich formations with very small pores exhibit characteristics that tend to be very different from those observed in conventional reservoirs. The enormous size of the unconventional resources and the technical challenges in producing oil and gas from them economically explain why this research is so vitally important.

My own interests require accurate petrophysical descriptions of these resources as a starting point. I am especially interested in her work on kerogen conductivity and the implication that this could result in overestimation of water saturation. Such fundamental observations help to resolve apparent contradictions I have encountered. I also find her work to characterize connectivity between microcracks and nanopores of critical importance, and her nuclear magnetic resonance modeling work is ground breaking. Her ideas related to applying petrophysics to completion evaluation look quite promising and will also connect with my own interests.

I am involved in faculty search at the University of Houston and see files for many faculty applicants. Considering numbers of publications and the level of funding she has attracted, Dr. Heidari's accomplishments soar over the applicants we have seen.

Dr. Heidari is on a trajectory toward continued recognition for her work. I have watched her grow over the few years I have known her and seen her gain confidence in what she does. She is already receiving regional professional awards and showing leadership in the industry and among academics. She has an excellent sense of how to investigate fundamental questions and relate the results to practical issues.

Dr. Heidari's record speaks for itself. She has been successful in every direction important to tenure track faculty and, from my experience on both department and college level promotion and tenure committees, she would easily be awarded promotion and tenure at TAMU or UH.

Sincerely,



Dr. Christine Ehlig-Economides
Professor and Hugh Roy and Lillie Cranz Cullen Distinguished University Chair

Tuesday, September 5, 2017 at 9:53:31 AM Central Daylight Time

Subject: [UTEXAS: ATTACHMENT UNSCANNED] RE: Promotion Letter Request, Zoya Heidari

Date: Sunday, July 23, 2017 at 9:29:20 PM Central Daylight Time

From: Ehlig-Economides, Christine

To: Stickney, Stephanie

Stephanie,

Please see attached.

Christine

From: Stickney, Stephanie [mailto:stickney@austin.utexas.edu]

Sent: Friday, July 21, 2017 3:13 PM

To: Ehlig-Economides, Christine <ceconomi@Central.UH.EDU>

Cc: Olson, Jon <jolson@austin.utexas.edu>; Stickney, Stephanie <stickney@austin.utexas.edu>

Subject: Re: Promotion Letter Request, Zoya Heidari

Hi Christine,

Thank you very much for your letter of recommendation. As part of the promotion process we need the C.V.s of the letter writers. Could you please send me your C.V. at your earliest convenience?

Gratefully,

STEPHANIE STICKNEY, Executive Assistant

The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-1210 | www.pge.utexas.edu

From: "Ehlig-Economides, Christine" <ceconomi@Central.UH.EDU>

Date: June 25, 2017 at 4:17:05 PM PDT

To: "Olson, Jon" <jolson@austin.utexas.edu>

Subject: RE: Promotion Letter Request, Zoya Heidari

Jon,

I am attaching the letter I have prepared. Please let me know if you have further questions.

Dr. Christine Ehlig-Economides

Professor and Hugh Roy and Lillie Cranz Cullen Distinguished University Chair

UH Petroleum Engineering

Energy Research Park Bldg 1A Rm 192A

Office: 713 743 6334

Mobile: 281 948 3621

From: Olson, Jon [<mailto:jolson@austin.utexas.edu>]
Sent: Thursday, June 22, 2017 11:43 PM
To: ceconomides@uh.edu
Cc: Stickney, Stephanie <stickney@austin.utexas.edu>
Subject: RE: Promotion Letter Request, Zoya Heidari

Hi Christine – I forgot to include Zoya's CV. Here it is. -Jon

Hook 'em!

Jon E. Olson, Chair and Frank W. Jessen Professor
Lois K. and Richard D. Folger Leadership Chair
The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-7375 |
www.pge.utexas.edu

From: Olson, Jon
Sent: Saturday, June 17, 2017 6:45 PM
To: ceconomides@uh.edu
Cc: Olson, Jon <jolson@austin.utexas.edu>; Stickney, Stephanie <stickney@austin.utexas.edu>
Subject: Promotion Letter Request, Zoya Heidari

Dear Christine - I have attached a letter requesting you to evaluate the promotion dossier of one of our assistant professors, Zoya Heidari. I have also attached her CV, 5 significant papers, and a brief research statement by Dr. Heidari.

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Please respond to this email as soon as is convenient as to whether you can do this evaluation. Assuming you are willing to participate, the deadline we are requesting for receiving your letter is July 7.

Thanks so much for your time and consideration.

-Jon

Hook 'em!

Jon E. Olson, Chair and Frank W. Jessen Professor
Lois K. and Richard D. Folger Leadership Chair
The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-7375 |
www.pge.utexas.edu

Dr. Christine A. Ehlig-Economides**Dr. Christine A. Ehlig-Economides**

Full Professor, Hugh Roy and Lillie Cranz Cullen Distinguished University Chair
 University of Houston
 Petroleum Engineering Program
 5000 Gulf Freeway, Houston, TX 77002
 713-743-6334
ceconomides@uh.edu

EDUCATION AND TRAINING

<u>Institution</u>	<u>Major/Area</u>	<u>Degree & Year</u>
Rice University	Math-Science	BA, 1971
University of Kansas	Math Education	MAT, 1974
University of Kansas	Chemical Engineering	MS, 1976
Stanford University	Petroleum Engineering	PhD, 1979

PROFESSIONAL EXPERIENCE

Professor, Professor and Hugh Roy and Lillie Cranz Cullen Distinguished University Chair
 (University of Houston, Petroleum Engineering Program, September 2014 to present)

Professor, Albert B. Stevens Endowed Chair (Texas A&M University, Petroleum Engineering Department, June 2004 to September 2014)

Professor and Petroleum Engineering Program Director (University of Houston, Chemical Engineering Department, January 2000-May 2004)

Visiting Professor (Stanford University, spring quarter of 1995), (University of Houston, spring of 1994)

Global Account Manager (Schlumberger Oilfield Services, Houston, TX, July 1999-September 2003)

Manager, GeoQuest Reservoir Technologies, Caracas (Schlumberger GeoQuest, Caracas, Venezuela, September, 1997 to July, 1999)

Technical and Marketing Manager Production Enhancement (Schlumberger Oilfield Services, Sugar Land, TX, July 1996 to September, 1997)

Technical Advisor (Anadrill Schlumberger, Sugar Land, TX, July, 1995 to July, 1996), (Schlumberger International Coordination, Houston, TX, Jan. 1993 to the July, 1995)

Project Leader: Reservoir Dynamics (Etudes et Productions, Schlumberger, Clamart, France, June 1990 Dec. 1992), **Layered Reservoir Testing** (Schlumberger Perforating and Testing, Houston, TX, August 1986 to January 1988), **Dynamic Reservoir Description** (Flopertol Johnston Schlumberger, Melun, France, September 1983 to August 1986)

Head, Petroleum Engineering Department (University of Alaska, Fairbanks, AK, 1981-83) Assistant Professor of Petroleum Engineering (University of Alaska, 1980-83)

PUBLICATIONS

1. Lee, K. J., Moridis, G. J., & Ehlig-Economides, C. A. (2016, October 1). A Comprehensive Simulation Model of Kerogen Pyrolysis for the In-situ Upgrading of Oil Shales. Society of Petroleum Engineers. doi:10.2118/173299-PA
2. Yan, C., Luo, G., & Ehlig-Economides, C. A. (2015, March 1). Systematic Study of Bakken Well Performance Over Three Well-Completion-Design Eras. Society of Petroleum Engineers. doi:10.2118/171566-PA

3. Pang, W., Du, J., Zhang, T., & Ehlig-Economides, C. A. (2016, February 1). Actual and Optimal Hydraulic-Fracture Design in a Tight Gas Reservoir. Society of Petroleum Engineers. doi:10.2118/168613-PA
4. Sorek, N., Moreno, J. A., Rice, R., Luo, G., & Ehlig-Economides, C. (2014, October 27). Optimal Hydraulic Fracture Angle in Productivity Maximized Shale Well Design. Society of Petroleum Engineers. doi:10.2118/170965-MS
5. Li, H., Zou, Y., Valko, P. P., & Ehlig-Economides, C. (2016, February 1). Hydraulic Fracture Height Predictions in Laminated Shale Formations Using Finite Element Discrete Element Method. Society of Petroleum Engineers. doi:10.2118/179129-MS
6. Morangiu-Porcu, M., Economides, M.J., and Ehlig-Economides, C.A.: "Global Model for Fracture Falloff Analysis," SPE 144028 presented at the SPE North American Unconventional Gas Conference and Exhibition held in The Woodlands, Texas, USA, 14–16 June 2011.
7. Liu, G., & Ehlig-Economides, C. (2015, September 28). Comprehensive Global Model for Before-Closure Analysis of an Injection Falloff Fracture Calibration Test. Society of Petroleum Engineers. doi:10.2118/174906-MS
8. Chaudhary, A.S., Ehlig-Economides, C.A., Wattenbarger, R.: "Shale Oil Production Performance from a Stimulated Reservoir Volume," SPE 147596 prepared for presentation at the SPE Annual Technical Conference and Exhibition held in Denver, Colorado, USA, 30 October–2 November 2011.
9. Merry, H., Ehlig-Economides, C. A., & Wei, P. (2015, September 28). Model for a Shale Gas Formation with Salt-Sealed Natural Fractures. Society of Petroleum Engineers. doi:10.2118/175061-MS
10. Ehlig-Economides, C. A., Apiwathanasorn, S., Ahmed, I., and Lightner, J. Song, B. Vera, F., Xue, H., and Zhang, Y., "Stimulated Shale Volume Characterization: Multiwell Case Study from the Horn River Shale: II Flow Perspective," SPE 159546, prepared for presentation at the SPE Annual Technical Conference and Exhibition held in San Antonio, Texas, USA, 8-10 October 2012.
11. Tao, Q., Ehlig-Economides, C.A., and Ghassemi, A. 2009. Investigation of Stress-Dependent Fracture Permeability in Naturally Fractured Reservoirs Using a Fully Coupled Poroeleastic Displacement Discontinuity Model. Paper presented at the SPE Annual Technical Conference and Exhibition, New Orleans, Louisiana. Society of Petroleum Engineers SPE-124745-MS. DOI: 10.2118/124745-ms
12. Vera, F.: "Evidence of Pressure Dependent Permeability in Long-Term Shale Gas Production and Pressure Transient Responses," M.S. Thesis, Texas A&M University, 2012, paper in preparation.
13. Ahmed, Ibraheem: "Investigation of Created Fracture Geometry through Hydraulic Fracture Treatment Analysis," M.S. Thesis, Texas A&M University, 2012, paper in preparation.

Books

1. Economides, M.J., Hill, A. Daniel, and Ehlig-Economides, C.A., Zhu, Ding: *Petroleum Production Systems Second Edition*, PTR Prentice Hall, Englewood Cliffs, NJ, 2012.

RECENT TRAINING ACTIVITY

1. ENI – Production Optimization in San Donato, Mozambique, Angola, Congo
2. ENI – Well Testing, Natural Gas Engineering in Mozambique
3. SCA – Reservoir Engineering, Well Testing in US, Norway, South Korea
4. Technion – Reservoir Engineering, Natural Gas Engineering in Israel
5. University of Cyprus – Reservoir Engineering
6. Unconventional Resource Engineering in Adelaide, Australia

BC



STANFORD UNIVERSITY

Prof. Roland N. Horne
ph:(650)723-9595 fax:(650)725-2099
e-mail: horne@stanford.edu

Department of Energy Resources Engineering
367 Panama Street
Stanford University, CA 94305-2220, USA

July 12, 2017

Professor Jon E. Olson
Lois K. and Richard D. Folger Leadership Chair
Department of Petroleum and Geosystems Engineering
The University of Texas at Austin
200 E. Dean Keeton St., Stop C0300
Austin, TX 78712-1585

Dear Professor Olson:

I am writing in response to your request for a reference for Prof. Zoya Heidari, with respect to her possible advancement in rank to the position of Associate Professor, with tenure.

1. I have known Zoya Heidari since meeting her during a visit to Texas A&M in 2015. During my visit to Texas A&M, I had the opportunity to see and discuss her research first hand. We invited her to Stanford to present her research results at our department seminar. In responding to your request, I have also reviewed a number of her recent publications.

2. In terms of contributions to the discipline, Prof. Heidari's research has involved development of advanced techniques in petrophysics. Her research has represented series of theoretical breakthroughs in quantitative understanding of an important subject to the oil industry. Notably, her research has encompassed theoretical, experimental, and computational approaches. With regard to her publications, I think Prof. Heidari and her students have made significant contributions in the area of rock mechanics. This work is world class, and has advanced our understanding of the distribution and mechanisms of hydrocarbon placement in the porous structures of tight rocks.

3. Prof. Heidari has a wide range of technical interests in which she strives and succeeds in meeting the highest standards. Her breadth is exemplified by the fact that her original Bachelor's and MS degrees were in mechanical and biomechanical engineering, but she then went into petroleum engineering in her PhD and subsequent research. Through her earlier programs, she has been able to bring considerable strength in other fields of engineering into her research. Given the extent and range of her background, I would say that she has developed greater breadth than most Professors of Petroleum Engineering at a similar career stage.

4. Work of her caliber and extent would certainly be competitive for a tenured position as an Associate Professor in our department at Stanford University.

5. Keeping Prof. Heidari at UT Austin will surely maintain the great strength that your department enjoys currently as an internationally-renowned program. Her career is on an upward trajectory that indicates that her academic future is bright. Her expertise would be difficult to replace, were she to leave your department.

In summary, I have complete admiration for Prof. Heidari's very broad range of achievements and abilities. I therefore have no hesitation in recommending her for a position as Associate Professor, with tenure, in your university.

With Best Regards

A handwritten signature in black ink, appearing to read "Roland N. Horne". The signature is fluid and cursive, with a long horizontal stroke at the end.

Roland N. Horne
Thomas Davies Barrow Professor of Earth Sciences
Professor of Energy Resources Engineering

Tuesday, September 5, 2017 at 9:57:43 AM Central Daylight Time

Subject: FW: Promotion Letter Request, Zoya Heidari

Date: Wednesday, July 12, 2017 at 6:50:21 PM Central Daylight Time

From: Olson, Jon

To: Stickney, Stephanie

Fyi,,

Hook 'em!

Jon E. Olson, Chair and Frank W. Jessen Professor

Lois K. and Richard D. Folger Leadership Chair

The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-7375 | www.pge.utexas.edu

-----Original Message-----

From: Roland N. Horne [<mailto:horne@stanford.edu>]

Sent: Wednesday, July 12, 2017 6:24 PM

To: Olson, Jon <jon@utexas.edu>

Subject: Re: Promotion Letter Request, Zoya Heidari

Hi Jon:

Please find attached my letter for Zoya Heidari.

Sorry this is a little late, I was in China last week...

At 05:02 PM 6/17/2017, you wrote:

Dear Roland – It was good talking to you on the phone the other day. Thanks for being willing to help us in our tenure/promotion process. As you know, the academic promotion process depends heavily on the role of outside, impartial evaluators. I have attached a letter requesting you to evaluate the promotion dossier of one of our assistant professors, Zoya Heidari. I have also attached her CV, 5 significant papers, and a brief research statement by Dr. Heidari.

The deadline we are requesting for receiving your letter is July 7.

Thanks so much for your time and consideration.

-Jon

Hook 'em!

Jon E. Olson, Chair and Frank W. Jessen Professor Lois K. and Richard

D. Folger Leadership Chair The University of Texas at Austin |

Petroleum and Geosystems Engineering | 512-471-7375 |

<www.pge.utexas.htm>www.pge.utexas.edu

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Page 1 of 2

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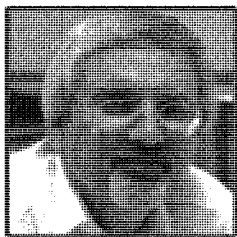
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+cnAZ4BQq8zye4bS2ByFTY38Mqg==

Stanford



Roland Horne

Thomas Davies Barrow Professor in the School of Earth, Energy & Environmental Sciences and Senior Fellow at the Precourt Institute for Energy
Energy Resources Engineering

Bio

ACADEMIC APPOINTMENTS

- Professor, Energy Resources Engineering
- Senior Fellow, Precourt Institute for Energy
- Affiliate, Stanford Woods Institute for the Environment

ADMINISTRATIVE APPOINTMENTS

- Visiting Researcher(while on sabbatical), University of Tokyo, (2015-2016)
- Senior Fellow, Precourt Institute for Energy, Stanford University, (2010- present)
- Thomas Davies Barrow Professor of Earth Sciences, Stanford University, (2008- present)
- Senior Fellow by Courtesy, Woods Institute for the Environment, (2008-2010)
- Professor of Energy Resources Engineering, Stanford University, (2006- present)
- Visiting Scientist, RITE, Kyoto, Japan (while on sabbatical), Research Institute for Innovative Technology for the Earth (RITE), (2005-2005)
- Professor of Petroleum Engineering, Stanford University, (1991-2006)
- Visiting Scientist, (while on sabbatical), Mobil Exploration and Production Services Inc., (1990-1990)
- Visiting Professor of Petroleum Engineering (while on sabbatical), Heriot-Watt University, (1989-1989)
- Associate Professor of Petroleum Engineering, Stanford University, (1984-1991)
- Assistant Professor of Petroleum Engineering, Stanford University, (1981-1984)
- Acting Assistant Professor of Petroleum Engineering, Stanford University, (1980-1980)
- Lecturer, Geothermal Institute, University of Auckland, (1978-1979)
- Acting Assistant Professor of Petroleum Engineering, Stanford University, (1977-1978)
- Acting Assistant Professor of Chemical Engineering, Stanford University, (1976-1977)
- Energy Research Fellow, University of Auckland, (1974-1976)

HONORS AND AWARDS

- Fellow, School of Engineering, University of Tokyo (2017)
 - Honorary Professor, China University of Petroleum (2016)
 - Geothermal Special Achievement Award, Geothermal Resources Council (2015)
 - Best Paper in 'Geophysics', Society of Exploration Geophysicists (2012)
 - Patricius Medal, German Geothermal Society (2011)
-

Roland Horne
http://cap.stanford.edu/profiles/Roland_Horne/

- SPE Distinguished Lecturer, Society of Petroleum Engineers (2009-2010)
- Guest Professor, China University of Petroleum (2007-2012)
- SPE Honorary Member, Society of Petroleum Engineers (2007)
- School of Earth Sciences Teaching Award, Stanford University (2007)
- Henry J. Ramey, Jr., Geothermal Reservoir Engineering Award, Geothermal Resources Council (2006)
- Geothermal Resources Council Best Paper Award, Geothermal Resources Council (2005)
- John Franklin Carll Award, Society of Petroleum Engineers (2005)
- Elected Member, National Academy of Engineering (2002)
- Geothermal Resources Council Best Paper Award (2), Geothermal Resources Council (2002)
- Geothermal Resources Council Best Paper Award, Geothermal Resources Council (2000)
- Lester C. Uren Award, Society of Petroleum Engineers (2000)
- SPE Distinguished Member, Society of Petroleum Engineers (2000)
- SPE Distinguished Lecturer, Society of Petroleum Engineers (1997-1998)
- Best Paper of 1993 Award, SPE Formation Evaluation, Society of Petroleum Engineers (1993)
- Best Paper of 1992 Award, Journal of Petroleum Technology, Society of Petroleum Engineers (1992)
- School of Earth Sciences Teaching Award, Stanford University (1989)
- SPE Distinguished Achievement Award for Petroleum Engineering Faculty, Society of Petroleum Engineers (1982)
- Fellow, Fulbright-Hays Traveling Fellowship (1977)

PROFESSIONAL EDUCATION

- D.Sc., University of Auckland , Engineering (1986)
- Ph.D., University of Auckland , Theoretical and Applied Mechanics (1975)
- B.E., University of Auckland , Theoretical and Applied Mechanics (1972)

LINKS

- Geothermal: <http://pangea.stanford.edu/researchgroups/geothermal/>
- SUPRI-D: Well Testing: <http://pangea.stanford.edu/researchgroups/suprid/>

PENNSTATE

BC



John and Willie Leone Family
Department of Energy and
Mineral Engineering

The Pennsylvania State University
110 Hosler Building
University Park, PA 16802

(814) 865-3437
Fax: (814) 865-3248
www.eme.psu.edu/
EME@ems.psu.edu

**Undergraduate
Programs:**

Energy Business and
Finance

Energy Engineering

Environmental Systems
Engineering

Mining Engineering

Petroleum and Natural
Gas Engineering

Graduate Program:

Energy and
Mineral Engineering

Online Program:

Bachelor of Arts Degree
in Energy and
Sustainability Policy

July 5, 2017

Re: Assessment of Dr. Zoya Heidari for Tenure and Promotion

Dear Dr. Olson,

I have known Dr. Heidari for about 10 years, since I taught at the University of Texas at Austin where she was a graduate student. I have also served as the Chair of various committees within SPE that have evaluated her research while at Texas A&M and at UT-Austin. I am, therefore, very aware of her abilities and background over the years.

My main focus in a tenure promotion review is on the candidates' research. My perspective is based on my experience on various promotion committees at both UT-Austin and at Penn State. At Penn State, we would expect the candidate to have about three journal publications per year in quality journals and to have attained a national reputation in a key area of petroleum engineering. We also require demonstrated excellence in teaching and at least one PhD student to have been graduated by the candidate.

Dating back to fall 2011, Dr. Heidari has published 29 papers in high quality journals, with an average of nearly five publications per year. She has published mostly in petrophysical journals such as *Geophysics*, *Interpretation*, and *SPE Formation Evaluation*. Her primary research topic is on the evaluation of unconventional resources, such as oil and gas shales through petrophysical means. Her number of publications significantly exceeds what I would expect from an assistant faculty going up for promotion.

Zoya's technical papers are of very high quality; her group has developed several important key findings. I am particularly aware of her recent papers that were evaluated for the Cedric K. Ferguson SPE international award. Her paper for "Directional-Permeability Assessment in Formations With Complex Pore Geometry With a New Nuclear-Magnetic- Resonance-Based Permeability Model" won the 2017 Ferguson award, which is given to the best technical paper for authors under 33. This is a major international award that bodes well for her future. She and her students showed a new way to estimate permeability anisotropy more accurately from nuclear magnetic resonance (NMR) tools without using current empirical correlations, which are particularly inaccurate for carbonates. The method proposed in this paper incorporates a directional pore-connectivity factor directly into conventional permeability estimations from T2 relaxation time. Comparisons between measured permeability data and the estimated permeability from this paper's model and conventional approaches show significant improvement in accuracy. Permeability anisotropy is a critical parameter for the design and recovery of oil from waterflooding and EOR floods. Besides the SPE award, she has received numerous other research awards that clearly demonstrate her research excellence.

Her funding level also greatly exceeds what I would expect from an assistant faculty going up for tenure and promotion. She raised nearly \$3.3 million while at Texas A&M, and appears to be doing well in this area at UT-Austin also. She is trying to begin a 2nd consortium in the unconventional area at UT-Austin. Her current consortium on formation evaluation appears quite successful at around six companies.

College of Earth and Mineral Sciences

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EME@ems.psu.edu

**Undergraduate
Programs:**

Energy Business and
Finance

She has graduated five PhD students while at Texas A&M, and currently has seven graduate students at UT-Austin. The only negative here is that she has not graduated a PhD at UT-Austin, but both universities are comparable in quality.

Energy Engineering

Environmental Systems
Engineering

Mining Engineering

Petroleum and Natural
Gas Engineering

Dr. Heidari's teaching portfolio looks very good over the last six years with student evaluations in a good range for an assistant faculty member (generally around 4 out of 5). She has taught significantly fewer courses, however, than what would have been expected at Penn State. She has taught one graduate and undergraduate course per year on average, compared to a typical load at PSU of three courses. That said, she has performed well in the courses she is teaching, and has used her "spare time" well in advancing her research.

Graduate Program:

Energy and
Mineral Engineering

Her service to the university and community appears excellent. She has served on numerous committees within the university and has given important service to SPE. Overall, I find no issues with her service, and believe she has exceeded expectations in this area.

Online Program:

Bachelor of Arts Degree
in Energy and
Sustainability Policy

Overall, Dr. Heidari's research, service, and teaching record clearly exceeds what is required for promotion to associate professor with tenure at Penn State, Please let me know if you have any questions.

Sincerely,

Dr. Russell T. Johns
Chair, Petroleum and Natural Gas Engineering Program
Beghini Professor of Petroleum and Natural Gas Engineering
John and Willie Leone Family Department of Energy and Mineral Engineering
The Pennsylvania State University
119 Hosler Building
University Park, PA 16802
814-865-0531, Fax: 814-865-3248, rjohns@psu.edu

Tuesday, September 5, 2017 at 9:54:14 AM Central Daylight Time

Subject: RE: Promotion Letter Request, Zoya Heidari
Date: Friday, July 21, 2017 at 5:57:16 PM Central Daylight Time
From: Russell T. Johns
To: Stickney, Stephanie, Olson, Jon

Hi – Here it is. Russ.

Dr. Russell T. Johns
Chair Petroleum and Natural Gas Engineering Program
Beghini Faculty Fellowship in Petroleum and Natural Gas Engineering
John and Willie Leone Family Department of Energy and Mineral Engineering
The Pennsylvania State University
119 Hosler Building
University Park, PA 16802
814-865-0531
Fax: 814-865-3248
rjohns@psu.edu

From: Stickney, Stephanie [<mailto:stickney@austin.utexas.edu>]
Sent: Friday, July 21, 2017 4:13 PM
To: Russell T. Johns <rjohns@psu.edu>; Olson, Jon <jolson@austin.utexas.edu>
Cc: Stickney, Stephanie <stickney@austin.utexas.edu>
Subject: Re: Promotion Letter Request, Zoya Heidari

Hi Russell,

Thank you very much for your letter of recommendation. As part of the promotion process we need the C.V.s of the letter writers. Could you please send me your C.V. at your earliest convenience?

Gratefully,

STEPHANIE STICKNEY, Executive Assistant
The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-1210 | www.pge.utexas.edu

From: "Russell T. Johns"
Date: Wednesday, July 5, 2017 at 2:30 PM
To: Jon Olson
Cc: Stickney
Subject: RE: Promotion Letter Request, Zoya Heidari

Hi Jon,

Here is the assessment of Dr. Heidari for tenure and promotion. She is doing very well.

Let me know if you need anything else.

Russ.

Dr. Russell T. Johns
Chair Petroleum and Natural Gas Engineering Program
Beghini Faculty Fellowship in Petroleum and Natural Gas Engineering
John and Willie Leone Family Department of Energy and Mineral Engineering
The Pennsylvania State University
119 Hosler Building
University Park, PA 16802
814-865-0531
Fax: 814-865-3248
rjohns@psu.edu

From: Olson, Jon [<mailto:jolson@austin.utexas.edu>]
Sent: Friday, June 23, 2017 12:47 AM
To: Russell T. Johns <rjohns@psu.edu>
Cc: Stickney, Stephanie <stickney@austin.utexas.edu>
Subject: RE: Promotion Letter Request, Zoya Heidari

Hi Russ ~ Here is Zoya's CV which didn't get sent I don't think. Thanks again for your help. -Jon

Hook 'em!

Jon E. Olson, Chair and Frank W. Jessen Professor
Lois K. and Richard D. Folger Leadership Chair
The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-7375 | www.pge.utexas.edu

From: Olson, Jon
Sent: Saturday, June 17, 2017 7:04 PM
To: rjohns@psu.edu
Cc: Olson, Jon <jolson@austin.utexas.edu>; Stickney, Stephanie <stickney@austin.utexas.edu>
Subject: Promotion Letter Request, Zoya Heidari

Dear Russ – It was good talking to you on the phone the other day. Thanks for your willingness to write a letter for us. As you know, the academic promotion process depends heavily on the role of outside, impartial evaluators.

I have attached a letter requesting you to evaluate the promotion dossier of one of our assistant professors, Zoya Heidari. I have also attached her CV, 5 significant papers, and a brief research statement by Dr. Heidari.

The deadline we are requesting for receiving your letter is July 7. Let me know if that is a problem.

Thanks so much for your time and consideration. Have a great trip to Asia!

-Jon

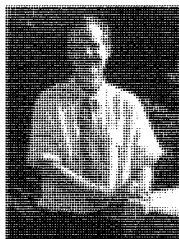
Hook 'em!

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Russell T. Johns

Professor of Petroleum and Natural Gas Engineering
Program Chair for Petroleum and Natural Gas Engineering
FCMG Chair in Fluid Behavior and Rock Interactions

119 Hosler Building
814-865-0531
rjohns@psu.edu

[View Full CV](#) 
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Biographical Sketch:

Russell T. Johns is the Chair of the Petroleum and Natural Gas Engineering program, he holds the Victor and Anna Mae Beghini Fellowship in Petroleum and Natural Gas Engineering in the Department of Energy and Mineral Engineering at The Pennsylvania State University. Prior to his current position, he served on the petroleum engineering faculty at The University of Texas at Austin from 1995 to 2010. He also has nine years of industrial experience as a petrophysical engineer with Shell Oil and as a consulting engineer for Colenco Power Consulting in Baden, Switzerland. He holds a BS degree in electrical engineering from Northwestern University and MS and PhD degrees in petroleum engineering from Stanford. His research interests include enhanced oil recovery, thermodynamics and phase behavior, unconventional gas engineering, multiphase flow in porous media, and well testing. In these areas he has published over 250 technical papers, reports, and books including a recent update of the classic enhanced oil recovery book Fundamentals of Enhanced Oil Recovery. In 2016 he received the International SPE award in reservoir description and dynamics (chemical and gas flooding). Dr. Johns received the SPE Ferguson medal in 1993 for his research on the combined condensing/vaporizing gas-drive process. He served as Co-Executive Editor for SPE Reservoir Evaluation and Engineering journal from 2002 – 2004. In 2009, he was awarded the SPE Distinguished Member award. He is currently an Associate Editor for the SPE Journal and director of the Enhanced Oil Flooding consortium in the EMS Energy Institute at Penn State University.

Teaching

In addition to the courses he currently teaches at Penn State, Dr. Johns also has taught university courses in Advanced Well Testing, Petrophysics, Reservoir Engineering II (Waterflooding), Thermodynamics and Phase Behavior, Advanced Thermodynamics, Environmental Remediation, Flow in Porous Media, Engineering Design, Advanced Reservoir Engineering, and Enhanced Oil Recovery. He has also taught courses in Gas Flooding, Enhanced Oil Recovery, and Waterflooding to industry.

Educational Background:

Ph.D. (Petroleum Engineering), Stanford University, 1992
Ph.D. Minor (Water Resources), Stanford University, 1992
M.S. (Petroleum Engineering), Stanford University, 1989
B.S. (Electrical Engineering), Northwestern University, 1982

Certifications:

- Professional Petroleum Engineer in California

Research Interests:

- Enhanced oil recovery
- Unconventional gas recovery
- Theory of gas injection processes
- Geothermal energy
- Well testing

Active Research Projects:

Current active research projects include consortia of oil and gas companies to conduct research on gas flooding for enhanced oil recovery. He is also active in experimental studies of surfactant flooding of live crude oils. Additional projects include development of numerical simulation codes for Middle-Eastern oil fields.

Selected Publications:

1. Moinfar, A, Sepehrnoori, K., and Johns, R.T., Development of an Efficient Embedded Fracture Model for 3D Compositional Reservoir Simulation in Naturally Fractured Reservoirs, SPEJ, 19(2), pp. 289 – 303, 2013.
2. Ahmadi, K. and R.T. Johns, Multiple Mixing-Cell Model for MMP Determination, SPEJ, Volume 16, No. 4, pp. 733-742, December 2011.
3. Okuno, R., R.T. Johns, and K. Sepehrnoori, Three-Phase Flash in Compositional Simulation Using a Reduced Method, SPEJ, Volume 15, No. 3, pp. 689-703, September 2010
4. Okuno, R., Johns, R.T., and K. Sepehrnoori, Application of a Reduced Method in Compositional Simulation, SPEJ, Volume 15, Number 1, pp. 39-49, March, 2010.
5. Charbeneau, R., Johns, R.T., Lake, L.W., and McAdams, M., Free-product recovery of petroleum hydrocarbon liquids, Ground Water Monitoring & Remediation, 20(3), pp. 147-158, Summer 2000.
6. Johns, R.T., Correction to "Pressure solution for sequential hydraulic tests in low-transmissivity fractured and nonfractured media", Water Resour. Res., 34(10), p. 2781, October, 1998.
7. Johns, R.T. and Orr, F.M., Jr., Miscible gas displacement of multicomponent oils, SPEJ, 1(1), pp. 39-50, 1996.
8. Johns, R.T., Dindoruk, B., and Orr, F.M., Jr., Analytical theory of combined condensing/vaporizing gas drives, SPE Adv. Tech. Series, 1(2), pp. 7-16, 1993.
9. Lake, L.W., Johns, R.T., Rossen, B., and Pope, G., Fundamentals of Enhanced Oil Recovery, Society of Petroleum Engineers, pp. 496, ISBN:978-1-61399-328-6, Richardson, TX, 2014.
10. Johns, R.T. and Dindoruk, B., Enhanced Oil Recovery: Field Case Studies, Book editor: James Sheng, Chapter 1: Gas Flooding, Book chapter, pp. 1-22, ISBN: 978-0-12-386545-8, Elsevier, 2013.
11. Russell T. Johns, Penn State University, Editor, Authors: Perry M. Jarrell, BP, Charles E. Fox, Kinder Morgan, Michael H. Stein, BP, Steven L. Webb, Occidental Petroleum, Technical Writer: Linda A. Day, Practical Aspects of CO2 Flooding, SPE Monograph Series, Volume 22, ISBN 1-55563-096-0, Henry L. Doherty Memorial Fund of AIME, Society of Petroleum Engineers Inc., Richardson, Texas, 2002.
12. B. Nojabaei, N. Siripatrachai, R.T. Johns, T. Ertekin, Effect of large gas-oil capillary pressure on production: A compositionally-extended black oil formulation, Journal of Petroleum Science and Engineering, Volume 147, Pages 317-329, November 2016
13. Khorsandi, S., Qiao, C., & Johns, R. T., Displacement Efficiency for Low-Salinity Polymer Flooding Including Wettability Alteration. Society of Petroleum Engineers. doi:10.2118/179695-PA, October 2016
14. Khorsandi, S., Qiao, C., & Johns, R. T., Simulation of Surfactant/Polymer Floods With a Predictive and Robust Microemulsion Flash Calculation. Society of Petroleum Engineers. doi:10.2118/179566-PA, October 2016
15. Khorsandi, S., & Johns, R. T. (2016). Robust Flash Calculation Algorithm for Microemulsion Phase Behavior. Journal of Surfactants and Detergents, 19(6), 1273-1287.
16. Ghosh, S., & Johns, R. T. (2016). Dimensionless Equation of State to Predict Microemulsion Phase Behavior. Langmuir, 32(35), 8969-8979, August 2016

Recent Activities:

Activities

- Executive Editor for *SPEREE*
- Society of Petroleum Engineers (SPE)
- Graduate Studies Chairman
- American Geophysical Union (AGU)
- American Chemical Society (ACS)

Awards:*Awards/Honors/Recognitions*

- SPE Distinguished Membership Award (2009)
- "A Peer Apart" by SPE for technical reviews of journal papers
- 25 year club for SPE
- SPE outstanding technical editor
- Dean's fellow
- Departmental teaching awards

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C



Harold Vance Department of
PETROLEUM ENGINEERING
TEXAS A & M UNIVERSITY

Prof. Michael J King
Assistant Department Head
Foundation CMG Chair and
LeSuer Chair in Reservoir Management

July 7, 2017

Jon E. Olson
Chairman and Frank W. Jessen Professor
The Lois and Richard D. Folger Leadership Chair
Department of Petroleum and Geosystems Engineering
The University of Texas at Austin

Subject: Tenure and Promotion Assessment, Dr. Zoya Heidari

Dear Jon,

I am pleased to provide my assessment and letter of support of Dr. Zoya Heidari for tenure and for advancement in rank to the position of Associate Professor in the Department of Petroleum and Geosystems Engineering at the University of Texas at Austin. Based on her progress as a researcher she is certainly suitable for tenure and promotion at this time.

You have asked me four questions which I will answer in turn, as part of her evaluation.

First, you ask how long I have known Dr. Heidari and under what circumstances. In the Spring of 2011 I was chair of the faculty search committee in the Petroleum Engineering department at Texas A&M. At the time, Zoya was completing her PhD; she was shortlisted and invited in, and gave a very nice seminar on her work on petrophysical interpretation in unconventional shale reservoirs. She was hired, and joined our department in the Fall of 2011, where she remained until joining your department in the Fall of 2015. In her time at A&M, I did not directly collaborate with her, but was generally aware of her work through presentations given by her students. If I remember correctly, during her last year at A&M two of her graduate students did very well in the international SPE student paper competition and competed in the regional contest.

Second, you have asked about her original contributions in her research areas in petrophysical inversion and reservoir characterization. Although I am not a petrophysicist, I have done work on both pore scale and reservoir scale characterization. The techniques she has applied and developed show an excellent understanding of the interplay between measurement and interpretation. By combining local mechanistic models she has been able to infer more than is normally possible, for instance, on the interpretation of directional (tensor) permeability from log data. Other work has moved away from simple Archie exponents and the interpretation of water saturation in thinly bedded and unconventional reservoirs. Some of her most creative work has focused on the use of injected nanoparticles during formation testing to increase property contrast and to reduce uncertainty in interpretation. She has developed a solid body of work, with an excellent publication record, in multi-scale rock physics interpretation for carbonates and unconventional reservoirs.

3116 TAMU, 507 Richardson Building, College Station, Texas 77843-3116
(979) 845-2241 – FAX (979) 845-1307 – <http://www.pe.tamu.edu>

Third, you have asked me how I would evaluate Dr. Heidari's development compared to others in her cohort at research intensive universities. Of the Assistant Professors in our department at A&M she was one of the two best in her cohort. Where she certainly excelled was in her ability to quickly and effectively leverage her industry contacts to develop an innovative research program, which she "owned" and which would provide a foundation for her research and her students. This was very well done, which certainly places her in the top of her cohort in my estimation.

Finally, you have asked me to comment on Dr. Heidari's promise for further professional growth and leadership. She has already demonstrated considerable professional leadership in the development of her own research program, as I have just mentioned. However, in addition, she made a significant impact on the SPWLA, with, I believe, the formation of its first student chapter, of course, at Texas A&M. She, and her students, are beginning to make a solid impact on the profession, and I have every reason to believe that Zoya will continue to grow in her professional impact.

In summary, I am very pleased to provide this letter of support for the promotion of Dr. Zoya Heidari for tenure and for advancement in rank to the position of Associate Professor in the Department of Petroleum and Geosystems Engineering at the University of Texas at Austin. I regret that she is no longer in our department and about to receive tenure here, but I'm very pleased that she is at UT, where I am sure that she will thrive.

Sincerely,

A handwritten signature in black ink that reads "Michael J King". The signature is written in a cursive, flowing style.

Michael J King, PhD
Assistant Department Head
Foundation CMG Chair in Robust Reduced Complexity Modeling
Professor and Holder of the LeSuer Chair in Reservoir Management

3116 TAMU, 507 Richardson Building, College Station, Texas 77843-3116
(979) 845-2241 – FAX (979) 862-6579 – <http://www.pe.tamu.edu>

Tuesday, September 5, 2017 at 9:52:00 AM Central Daylight Time

Subject: FW: Promotion Letter Request, Zoya Heidari
Date: Friday, July 7, 2017 at 4:47:06 PM Central Daylight Time
From: Olson, Jon
To: Stickney, Stephanie

FYI.

Hook 'em!

Jon E. Olson, Chair and Frank W. Jessen Professor
Lois K. and Richard D. Folger Leadership Chair
The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-7375 | www.pge.utexas.edu

From: King, Mike [<mailto:mike.king@tamu.edu>]
Sent: Friday, July 07, 2017 4:29 PM
To: Olson, Jon <jolson@austin.utexas.edu>
Subject: RE: Promotion Letter Request, Zoya Heidari

Attached, with pleasure!

Please let me know that it's been received.

Mike

Sent from [Mail](#) for Windows 10

From: [Olson, Jon](#)
Sent: Friday, July 7, 2017 3:02 PM
To: [King, Mike](#)
Subject: RE: Promotion Letter Request, Zoya Heidari

Thanks Mike.

Hook 'em!

Jon E. Olson, Chair and Frank W. Jessen Professor
Lois K. and Richard D. Folger Leadership Chair
The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-7375 | www.pge.utexas.edu

From: King, Mike [<mailto:mike.king@tamu.edu>]
Sent: Friday, July 07, 2017 5:45 AM
To: Olson, Jon <jolson@austin.utexas.edu>
Cc: Stickney, Stephanie <stickney@austin.utexas.edu>
Subject: Re: Promotion Letter Request, Zoya Heidari

Jon,

Only have weak wifi right now. (In transit in UK.) Will get the letter to you this evening my time.

Mike King

On Jun 23, 2017, at 5:48 AM, Olson, Jon <jolson@austin.utexas.edu> wrote:

Mike – Here is the CV which apparently I neglected to send. !! -Jon

Hook 'em!

Jon E. Olson, Chair and Frank W. Jessen Professor
Lois K. and Richard D. Folger Leadership Chair
The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-7375 | www.pge.utexas.edu

From: Olson, Jon

Sent: Saturday, June 17, 2017 7:10 PM

To: mike.king@tamu.edu

Cc: Olson, Jon <jolson@austin.utexas.edu>; Stickney, Stephanie <stickney@austin.utexas.edu>

Subject: Promotion Letter Request, Zoya Heidari

Dear Mike – Thanks for agreeing earlier to write a letter for our Zoya. I have attached a formal letter requesting you to evaluate her promotion. I have also attached her CV, 5 significant papers, and a brief research statement.

As you know, the academic promotion process depends heavily on the role of outside, impartial evaluators.

The deadline we are requesting for receiving your letter is July 7.

Thanks so much for your time and consideration. I hope all is well in College Station. Do you have a name for a new chair yet?

-Jon

Hook 'em!

Jon E. Olson, Chair and Frank W. Jessen Professor
Lois K. and Richard D. Folger Leadership Chair
The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-7375 | www.pge.utexas.edu

<2017_05_Zoya Heidari_CV.pdf>

Michael J. King

Education

1980 Ph.D., Physics, Syracuse University, NY
1977 M.S., Physics, Syracuse University, NY
1976 B.S., Summa Cum Laude, Physics & Mathematics, Cooper Union, NYC

Experience

2012-present Assistant Department Head (Administration), Petroleum Engineering
2009-present Professor, Petroleum Engineering, Texas A&M University
2009-present Co-Director, Model Calibration & Efficient Reservoir Imaging JIP
1999-2009 BP America/BP Amoco E&P Upstream Technology Group:
 2007-2009 Discipline Technical Authority, Reservoir Performance Prediction
 2005-2009 Senior Advisor, Reservoir Modeling & Simulation
 2002-2009 Reservoir Performance Prediction R&D Project Management
 2002-2007 Technology Network Leader, Reservoir Performance Prediction
 2002-2005 Advisor, Reservoir Modeling & Simulation
 1999-2001 Technology Network Leader, Reservoir Modeling & Characterization
1996-1999 Consultant & Senior Reservoir Engineer, BP Exploration Operating Co, Ltd.
1991-1995 Research Positions, BP Research & Exploration, Sunbury-on-Thames, UK
1982-1990 Research Positions, Sohio/Standard Oil/BP Research, Warrensville, OH
1980-1982 Postdoctoral Fellow, Department of Physics, Michigan State University

Professional Registration

Professional Memberships

2011-present American Geophysical Union (AGU)
2011-present SIAM
2010-present Interpore
1982-present Society of Petroleum Engineers
1980-present Sigma Xi Scientific Research Society
1979-1989 Sigma Pi Sigma Physics Honorary Society
1979-1989 American Physical Society

Awards

2015 Energistics RESQML SIG 25 Year Volunteer Recognition Award
2014 Karen and Larry A. Cress '76 Excellence in Teaching Award
2013 SPE Distinguished Member
2013 Foundation CMG Chair in Robust Reduced Order Modeling
2012 LeSuer Chair in Reservoir Management
2012, 2013 Energistics Volunteer Recognition Program Award
2011 Petroleum Engineering Department Award for Excellence in Teaching
2011 SPE Reservoir Description and Dynamics Award
2010 John and Debbie Bethancourt Professor in Petroleum Engineering
2007 E&P DCT BP Helios Award Finalist "Reservoir Management Co-Visualization"
2006-2007 SPE Distinguished Lecturer

2005 BP Helios Award Finalist “Top Down Reservoir Modeling”
 2000 BP Helios Award Submission “3D Reservoir Modeling applied to fast track development of the CrazyHorse reservoir”
 1982 American Physical Society Industrial Post-Doctoral Fellowship
 1976-1980 Graduate Fellowship, Syracuse University
 1976 Honorable Mention, National Science Foundation Fellowship
 1976 The Henry D. Dickinson and Harry W. Reddick fund prizes
 1973 The Day Class of 1907 Award, The Cooper Union

Refereed Publications (list 10-15 top publications)

“Streamline Simulation: Theory and Practice”, SPE Textbook #11 (2007) (w/ Akhil Datta-Gupta).
 “From Streamlines to Fast Marching: Rapid Simulation and Performance Assessment of Shale Gas Reservoirs Using Diffusive Time of Flight as a Spatial Coordinate” SPE Journal (May 2016) (w/ Zhang, Y., Bansal, N., Fujita, Y., Datta-Gupta, A., & Sankaran, S.)
 “Depth of Investigation and Depletion in Unconventional Reservoirs With Fast-Marching Methods” SPE Journal (Jan. 2015), (w/ Xie, J., Yang, C., Gupta, N., & Datta-Gupta, A.)
 “Integration of Shale-Gas-Production Data and Microseismic for Fracture and Reservoir Properties With the Fast Marching Method” SPE Journal (July 2014) (w/ Xie, J., Yang, C., Gupta, N., & Datta-Gupta, A.)
 “Reservoir Modeling: From RESCUE To RESQML™,” SPE 135280 SPE Reservoir Evaluation & Engineering Volume 15, Number 2 (April 2012) (w/ Paulo Ballin, Chakib Bennis, David Heath, Allan Hiebert, William McKenzie, Jean-Francois Rainaud, and Jana Schey).
 “Full Field Streamline Tracing in Complex Faulted Systems With Non-Neighbor Connections,” SPE 113425, SPE Journal, Volume 15, Number 1 (March 2010) (w/ Eduardo Jimenez and Akhil Datta-Gupta).
 “Spatial Error and Convergence in Streamline Simulation,” SPE Reservoir Evaluation & Engineering, Volume 10, Number 3, pp. 221-232, June 2007 (w/ Eduardo Jimenez, Kamran Sabir, and Akhil Datta-Gupta).
 “Recent Advances in Upgridding” in Oil & Gas Science and Technology - Rev. IFP, Vol. 62, No. 2, pp. 195-205, 2007.
 “A Rigorous Compressible Streamline Formulation for Two- and Three-Phase Black-Oil Simulation,” SPE Journal, Volume 11, Number 4, pp. 407-417, December 2006 (w/ Hao Cheng, Ichiro Osako, and Akhil Datta-Gupta).
 “Optimal Coarsening of 3D Reservoir Models for Flow Simulation,” SPE Reservoir Evaluation & Engineering, Volume 24, Number 10, pp. 317-334, August 2006 (w/ Karam S. Burn, Pengju Wang, Venkataramanan Muralidharan, Freddy Alvarado, Xianlin Ma and Akhil Datta-Gupta).
 “Upgridding and Upscaling: Current Trends and Future Directions,” SPE Distinguished Lecture during 2006-2007, SPE 112810-DL, 2007.
 “Simulation and Theory of Two Phase Flow in Porous Media,” Physical Review A 46 7680-7699, 1992 (w/ Blunt, M., and Scher H.).
 “Geometric Dispersion and Unstable Flow in Porous Media,” Phys Rev A 41, 874, 1990 (w/ Scher H.).

C

STANFORD



UNIVERSITY

Department of Geophysics
Stanford, CA 94305-2215

PHONE (R. Knight): (650) 736-1487
EMAIL: rknight@pangea.stanford.edu

23 July 2017

Dr. Jon Olson
Dept. of Petroleum and Geosystems Engineering
The University of Texas at Austin

Dear Dr. Olson,

I am writing in response to your request that I provide an assessment of the scholarly contributions of Prof. Zoya Heidari. The following is written so as to address your list of questions.

There is somewhat limited overlap between my area of expertise and the work of Prof Heidara. What we have in common is an interest in rock physics, but I am a geophysicist with an interest in groundwater systems, while Prof. Heidara is a petroleum engineer with an interest in petroleum reservoirs. Much of Prof. Heidara's work focuses on carbonates and organic mudrocks; my focus has been sandstones and unconsolidated materials. The area of greatest overlap in our research is in the area of nuclear magnetic resonance (NMR); again the applications and materials are different, but her work on advancing the interpretation of NMR data is very relevant to the work I do.

I have not met nor interacted with Prof. Heidara. We do not attend the same conferences and tend to publish in different journals. This is not surprising given Prof. Heidara's interests in reservoirs and mine in aquifers. This does mean that our research is best known in different communities. As a result I have gone into this review with a lack of familiarity with Prof. Heidara's work so have spent some time reviewing her Research Statement and the provided publications. It is clear that she brings to her research an outstanding mix of careful experimental work and innovative computational approaches.

Given my research interests in NMR I focused on reading the three papers on this topic and below summarize my impressions of those papers.

Chi*, L. and Heidari, Z. 2015. Diffusional Coupling between Microfractures and Pore Structure and its Impact on Nuclear Magnetic Resonance Measurements in Multi-Porosity Systems. *Geophysics* **80** (1): D31 – D42. DOI: 10.1190/geo2013-0467.1

While all of my work focuses on porous media, and neglects microfractures, I found this to be an excellent paper, which convinced me that I *should* consider microfractures. The paper presents a very innovative approach where the theoretical treatment previously applied to inter-pore coupling is used to consider the presence of coupling between microfractures and pores, and the impact of this on NMR relaxation data. While the paper involved only simulated data, I was impressed by the attention paid to generating realistic models using micro-CT imaging. The comparison of the

analytical and numerical results was complete, thoughtful and revealed a deep understanding of the physics of the NMR measurement. In summary - an important and very well written paper.

Chi*, L., Cheng*, K., and Heidari, Z. 2016. Improved Assessment of Interconnected Porosity in Multiple- Porosity Rocks by Use of Nanoparticle Contrast Agents and Nuclear-Magnetic-Resonance Relaxation Measurements. *SPE Reservoir Evaluation & Engineering Journal, Formation Evaluation* **19** (1): 95 – 107. DOI: 10.2118/170792-PA

This paper is highly innovative, and takes a very clever approach to addressing a basic question in NMR – how to identify the interconnected porosity, and the signature of that porosity in relaxation data. The publication is outstanding in terms of the detail provided and makes it clear that Prof. Heidari is someone who is very careful in the design and completion of her experimental work. I was struck by the rigor displayed in the analysis of the data. I greatly appreciated the opportunity to review this paper; I will likely be building on it in my own current work on identifying mobile and immobile regions of the pore space in sediments.

Chi*, L. and Heidari, Z. 2016. Directional-Permeability Assessment in Formations with Complex Pore Geometry With a New Nuclear-Magnetic-Resonance-Based Permeability Model. *SPE Journal* **21** (4): 1436 – 1449. DOI: 10.2118/179734-PA

This is another excellent paper that seeks to address a critical limitation in the traditional interpretation of NMR data to estimate permeability – NMR provides a scalar, while permeability is a tensor. This paper thoughtfully considers ways to include information about anisotropy by exploring the use of 3D pore-scale images and the electrical formation factor. Again, I found myself impressed by the rigorous and innovative approach.

The provided papers are evidence of Prof. Heidara's outstanding abilities as a researcher. In her NMR research she has elected to address critical limitations in the current understanding and interpretation of NMR data. Her approach displays a considerable breadth of expertise covering numerous experimental approaches, numerical methods and theoretical analysis. Prof. Heidara has an ability to identify key problems and innovative solutions – a combination that leads to significant impact on a field of study.

In general, Prof. Heidari's C.V. is comparable to that of others which I have reviewed at the time of tenure. The number of publications is about right; I note a large increase in numbers in the last few years as her graduate students progress in their programs and publish their work. I appreciate seeing the number of publications from graduate students - Prof. Heidari clearly makes mentoring her students through the process of publication a priority, which I believe it should be.

There is one area in Prof. Heidara's C.V. that is somewhat different from the C.V.'s of others that I have reviewed at the time of tenure: she has not been invited to give as many talks at universities, given the stage in her career and the interesting work that she is doing; and there are no invited talks at major conferences.

I have found this a very interesting package to review. I can assure you that I learned a lot, and have been very impressive by the types of problems being addressed and the way in which Prof. Heidari has elected to tackle them. It is unfortunate that I was not more familiar with Prof. Heidari and her research, which should not be taken as a reflection on her, but a statement about how busy I have become, and therefore how limited I have become in terms of my conferences and journal readings.

My overall impression is that Prof. Heidara is an exceptionally talented researcher, who has established a productive research group tackling important problems in innovative ways.

Sincerely,

A handwritten signature in cursive script that reads "Rosemary Knight". The signature is written in black ink and is positioned above the printed name.

Rosemary Knight
George L. Harrington Professor of Earth Sciences

Tuesday, September 5, 2017 at 9:50:12 AM Central Daylight Time

Subject: FW: Promotion Letter Request, Zoya Heidari
Date: Monday, July 24, 2017 at 9:26:22 AM Central Daylight Time
From: Olson, Jon
To: Stickney, Stephanie

FYI.

Hook 'em!

Jon E. Olson, Chair and Frank W. Jessen Professor
Lois K. and Richard D. Folger Leadership Chair
The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-7375 | www.pge.utexas.edu

From: Rosemary J. Knight [mailto:rknight@stanford.edu]
Sent: Sunday, July 23, 2017 2:35 PM
To: Olson, Jon <jolson@austin.utexas.edu>
Cc: Stickney, Stephanie <stickney@austin.utexas.edu>
Subject: Re: Promotion Letter Request, Zoya Heidari

Dear Jon

Letter attached. Unfortunately I do not know Dr. Heidara, but was able to review her publications. Our fields have become so compartmentalized!

Rosemary

On Jun 22, 2017, at 8:03 PM, Olson, Jon <jolson@austin.utexas.edu> wrote:

Hi Rosemary - Thanks for the quick response. We can work with that schedule if you can get it down that week. Thanks for your help.

- Jon

Jon E. Olson, Chairman and Professor
Petroleum & Geosystems Engineering
The University of Texas at Austin
Sent from my iPhone

On Jun 20, 2017, at 5:54 PM, Rosemary J. Knight <rknight@stanford.edu> wrote:

Dear John

It does seem like yesterday! Would like to help but the timing on this is not good. I am beyond over-committed for the next month, leaving in a few days to sort, move stuff and sell my parents' home; and get my mother settled in a retirement home.

The first I could do this is the week of July 17.

Rosemary

On Jun 17, 2017, at 5:06 PM, Olson, Jon <jolson@austin.utexas.edu> wrote:

Dear Rosemary 🍀 I hope you are doing well. It seems like just yesterday I was taking Rock Physics from you when we were both still graduate students (or maybe you were a post-doc?). ☺

I have attached a letter requesting you to evaluate the promotion dossier of one of our assistant professors, Zoya Heidari. I have also attached her CV, 5 significant papers, and a brief research statement by Dr. Heidari.

As you know, the academic promotion process depends heavily on the role of outside, impartial evaluators. I hope we can count on you to help.

Please respond to this email as soon as is convenient as to whether you can do this evaluation. Assuming you are willing to participate, the deadline we are requesting for receiving your letter is July 7.

Thanks so much for your time and consideration. I hope to run into you at Stanford sometime.

-Jon

Hook 🍀em!

Jon E. Olson, Chair and Frank W. Jessen Professor
Lois K. and Richard D. Folger Leadership Chair
The University of Texas at Austin | Petroleum and Geosystems Engineering |
512-471-7375 | www.pge.utexas.edu

<Heidari-papers.zip><Zoya Heidari_Research Summary.pdf><Knight request.pdf>

Rosemary Knight
http://cap.stanford.edu/profiles/Rosemary_Knight/

Stanford

Rosemary Knight

The George L. Harrington Professor in the School of Earth, Energy & Environmental Sciences and
Senior Fellow, by courtesy, at the Woods Institute for the Environment Geophysics

Bio

ACADEMIC APPOINTMENTS

- Professor, Geophysics
- Senior Fellow, by Courtesy, Stanford Woods Institute for the Environment

ADMINISTRATIVE APPOINTMENTS

- Acting Assistant Professor Geophysics, Stanford University, (1984-1987)
- NSERC University Research Fellow, University of British Columbia, (1987-1988)
- Assistant Professor, University of British Columbia, (1988-1993)
- Associate Professor, University of British Columbia, (1993-1998)
- Professor, University of British Columbia, (1998-2000)
- Professor Geophysics, Stanford University, (2000- present)
- Senior Fellow Stanford Institute for the Environment, Stanford University, (2005- present)

HONORS AND AWARDS

- Gold Medal in Geological Sciences, Queen's University (1976)
- NSERC University Research Fellowship, Natural Sciences and Engineering Resources Council (1987)
- Distinguished Speaker Award, Society of Professional Well Log Analysts (1991)
- Best Paper Award, MGLS/KEGS Symposium, "Borehole Geophysics for Minerals, Geotechnical...", Toronto, MGLS/KEGS (1991)
- Teaching Excellence Award, University of British Columbia (1992)
- Distinguished Lecturer, Canadian Geophysical Union (1995)
- Best Paper Award Honorable Mention, Society of Exploration Geophysicists (1996)
- Killam Research Prize for research excellence, University of British Columbia (1996)
- Charles McDowell Medal, for excellence in pure and applied research, University of British Columbia (1996)
- Distinguished Lecturer, Society of Exploration Geophysicists (1998)
- Frank Frischknecht Award, Society of Exploration Geophysicists Near Surface Section (2002)
- Life Membership Award, Society of Exploration Geophysicists (2009)
- Honorary Life Membership Award, Society of Exploration Geophysicists, Near-Surface Geophysics Section (2012)

PROFESSIONAL EDUCATION

- Ph.D., Stanford University , Geophysics (1985)
- M.S., Queen's University, Kingston, Ontario Canada , Geological Sciences (1978)
- B.S., Queen's University, Kingston, Ontario Canada , Geological Sciences (1976)

LINKS

- Environmental Geophysics: <http://pangea.stanford.edu/researchgroups/enviro>

DR. ERDAL OZKAN
F.H. "MICK" MERELLI/CIMAREX ENERGY
DISTINGUISHED DEPARTMENT HEAD CHAIR
PETROLEUM ENGINEERING



COLORADO SCHOOL OF MINES
EARTH • ENERGY • ENVIRONMENT

BC

July 6, 2017

Dr. Jon E. Olson, PhD, PE
Chairman and Frank W. Jessen Professor
The Lois and Richard D. Folger Leadership Chair
Department of Petroleum and Geosystems Engineering
The University of Texas at Austin
CPE 2.502, Austin, TX 78712

Ref: Promotion and Tenure Evaluation of Dr. Zoya Heidari

Dear Dr. Olson,

As you requested, I have reviewed the credentials of Assistant Professor Zoya Heidari for tenure and promotion to the rank of Associate Professor at the Department of Petroleum & Geosystems Engineering at The University of Texas at Austin. This letter presents my recommendation that she be granted tenure and promoted to Associate Professor. Below, first, I state my qualifications to provide this recommendation and, then, present the details of my assessment.

I am a tenured full professor and the Head of the Petroleum Engineering Department at the Colorado School of Mines (CSM). I have been in academia since 1989. I have over 120 papers, a book (co-authored), and three book chapters. I am a Distinguished Member of the Society of Petroleum Engineers (SPE) and the recipient of the 2013 SPE Lester C. Uren and 2007 SPE Formation Evaluation Awards. I have reviewed numerous promotion applications at CSM and other universities around the world throughout my academic career. I was a member (2011-2014) and the chair (2012-2013) of the CSM Promotion and Tenure Committee. I have also served as the Executive Editor of the SPE Reservoir Evaluation and Engineering Journal (2003-2005) and the Chief Editor of the Elsevier Journal of Petroleum Science and Engineering (2006 – 2008).

My broad area of technical expertise is reservoir engineering with particular focus on modeling transient fluid flow in porous media. I have never worked or collaborated with Dr. Heidari and my area of research is considerably different from hers. However, because of my focus on modeling flow and production in unconventional reservoirs and interest in rock and fluid characterization, I am familiar with the research problems she addresses. Therefore, my following evaluation will be based on her CV, the review of her five publications, and the research summary included in the package provided to me. I will use my knowledge of the standards and criteria commonly applied in the discipline of petroleum engineering. My focus in evaluating her publications will be on the importance and relevance of the topics, technical approach, originality, and the potential impact.

1600 Arapahoe St., Golden, CO 80401

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T 303-273-3188
F 303-273-3189
E eozkan@mines.edu

DR. ERDAL OZKAN
 F.H. "MICK" MERELLI/CIMAREX ENERGY
 DISTINGUISHED DEPARTMENT HEAD CHAIR
 PETROLEUM ENGINEERING



Based on her CV, Dr. Heidari had four peer reviewed publications and 11 papers in refereed conference proceedings before her academic appointment. Since her appointment as an Assistant Professor in Fall 2011, she has published 25 more peer-reviewed journal papers and 59 refereed conference papers in proceedings. This indicates an average of four peer-reviewed publications and six conference papers per year. The data collected by the Association of the US Petroleum Engineering Department Heads show that the average rate of productivity for the Petroleum Engineering faculty across the US is two to three peer-reviewed publications and three to five conference presentations. Dr. Heidari's productivity is clearly above the averages. Moreover, the journals she publishes in have some of the highest impact factors in the disciplines of geosciences and petroleum engineering, such as Applied Clay Science (3.101), AAPG Bulletin (2.77), Geophysics (2.391), Mathematical Geosciences (2.022), SPE Journal (2.208), Journal of Petroleum Science and Engineering (1.873), SPE Reservoir Evaluation & Engineering (1.729).

A cursory review of the Google Scholar profiles of the assistant professors in the peer US Petroleum Engineering Departments reveals slightly better records than that of Dr. Heidari (she has 313 citations, and h-index of 8, and i10-index of 7 as of the date of this letter). Although the citations and the h-index may be considered as an indication of the impact of her research, they may not be the best measures to assess the early career achievements of academicians. In this respect, the number of her invited presentations, talks at topical meetings, conferences, and webinars, and appearances in workshops (a total of as many as 40) should also be considered as a sign of acceptance of her technical expertise. Similarly, her funded research volume amounting to \$3.4 million since 2011 (or \$2.5 million after subtracting the amount terminated after leaving Texas A&M) is significantly higher than that for most of her peers (~\$300,000/year based on my knowledge) and must be credited to her recognition.

As for the assessment of Dr. Heidari's five sample publications, I will only comment on their general quality indicators because my area of expertise is different from hers. First, similar to the rest of her publications, the five publications included in the package are on the application of the NMR technology to the characterization of unconventional reservoirs. This is considered as one of the most promising approaches for the petrophysical characterization of unconventional reservoirs and Dr. Heidari appears to be at the forefront of the research activities on this topic. I note that all five publications include a comprehensive literature review and they unequivocally reference and explain the origin and the background of the core ideas of the paper. This comprehensive knowledge of background indicates good aptitude to address the eminent problems of the research field. Use of multiple research methods, such as conceptual, experimental, analytical, numerical, digital, etc., in every paper enriches the discussions and adds several layers of credibility to the papers. This is particularly noteworthy for the competence and versatility of Dr. Heidari to take on a wide variety of research challenges and indicates that her research focus can be changed easily with the changing needs of the industry. All five papers properly document the input data and the results of the research to ensure reproducibility. Overall, the technical language used in the papers is clear and organization is easy to follow.

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E eozkan@mines.edu

DR. ERDAL OZKAN
F.H. "MICK" MERELLI/CIMAREX ENERGY
DISTINGUISHED DEPARTMENT HEAD CHAIR
PETROLEUM ENGINEERING



As a final remark, Dr. Heidari's credentials place her highly among the applications I have reviewed for promotion and tenure at her rank. I would not expect her to have any problem in receiving a positive tenure and promotion decision at our institution.

In summary, based on my review of the documents provided to me and compared to the similar applications I have reviewed in the past, I recommend Dr. Heidari for tenure and promotion to Associate Professor at the Department of Petroleum & Geosystems Engineering at The University of Texas at Austin. Should there be any questions or concerns about my above assessments, please do not hesitate to contact me.

Sincerely,

Erdal Ozkan, Professor
F.H. "Mick" Merelli/Cimarex Energy Distinguished Department Head Chair in Petroleum Engineering
Colorado School of Mines
1600 Arapahoe Street
Golden, CO 80401
Phone: 1-303-273 3188
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Tuesday, September 5, 2017 at 9:55:09 AM Central Daylight Time

Subject: Re: Dr. Zoya Heidari

Date: Friday, July 21, 2017 at 3:13:23 PM Central Daylight Time

From: Stickney, Stephanie

To: eozkan@mines.edu

CC: Olson, Jon, Stickney, Stephanie

Hi Erdal,

Thank you very much for your letter of recommendation. As part of the promotion process we need the C.V.s of the letter writers. Could you please send me your C.V. at your earliest convenience?

Gratefully,

STEPHANIE STICKNEY, Executive Assistant

The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-1210 | www.pge.utexas.edu

From: Erdal Ozkan [<mailto:eozkan@mines.edu>]

Sent: Thursday, July 06, 2017 2:43 PM

To: Olson, Jon

Subject: Dr. Zoya Heidari

Jon,

Attached, please find my evaluation of Dr. Heidari's promotion and tenure package. Please let me know if you need a hard copy mailed to you.

Best,

Erdal Ozkan

Professor

F.H. "Mick" Merelli/Cimarex Energy Distinguished Department Head Chair in Petroleum Engineering

Colorado School of Mines

Marquez Hall, Room 206

1600 Arapahoe Street

Golden, CO 80401

Phone: 1-303-273 3188

Fax: 1-303-273 3189

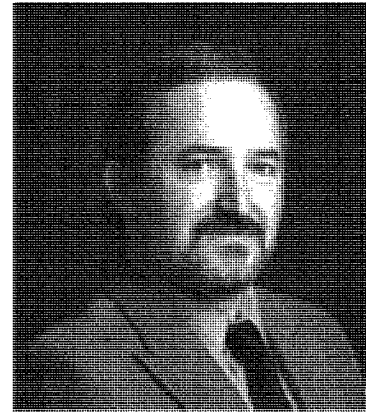
E-mail: eozkan@mines.edu

PETROLEUM ENGINEERING COLORADO SCHOOL OF MINES

**F.H. “Mick” Merelli/Cimarex Energy Distinguished
Department Head Chair**

Contact Information

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Golden, Colorado 80401 USA
Office: (303) 273-3188
FAX: (303) 273-3189
email: eoalkan@mines.edu



Education

B.S., M.S., Istanbul Technical University
Ph.D., University of Tulsa

Bio

Erdal Ozkan is a professor of Petroleum Engineering. He has BS and MS degrees from Istanbul Technical University and a Ph.D. degree from the University of Tulsa, all in Petroleum Engineering. He has over twenty years of teaching and research experience at Istanbul Technical University, The University of Tulsa, and Colorado School of Mines. His main research interests are horizontal and multilateral well technology, pressure-transient analysis, modeling fluid flow in porous media, and unconventional reservoirs. He joined the PE Department at Colorado School of Mines in 1998 and he is a co-director of Marathon Center of Excellence for Reservoir Studies (MCERS) and the Graduate Program Coordinator for the PE Department. Dr. Ozkan is a Distinguished Member of SPE and the recipient of the SPE Formation Evaluation Award (2007). He is also a member of the American Society of Mechanical Engineers, ASME, and The Mathematical Association of America.

Erdal Ozkan has published and presented over 100 papers in prestigious refereed journals and technical meetings, co-authored a book, and contributed to several others. Dr. Ozkan is also actively involved in the organization of technical conferences; some examples include the Steering Committee of the SPE Forum on Reservoir Engineering Aspects of Multilateral and Advanced Wells (1999), Chair of the Organizing Committee for the SPE Advanced Technology Workshop on Unconventional Gas (2006), Steering Committee of the SPE Advanced

Technology Workshop on Advances in Performance Diagnostics for Fractured and Horizontal Wells (2007), and Co-Chair of the Organizing Committee of the SPE Technical Conference on Shale Gas Production (2008 and 2010).

Dr. Ozkan serves in the editorial boards of the key technical journals. He was the Executive Editor of the SPE Reservoir Evaluation and Engineering, Chief Editor of Elsevier Journal of Petroleum Science and Engineering, and Associate Technical Editor of ASME Journal of Energy Resources Technology. He also serves as a referee for several US and international research foundations. He is a member of the SPE Reservoir Description and Dynamics Advisory Committee and a Technical Director of the SPE Research and Development Technical Section.

BC



The UNIVERSITY of OKLAHOMA
Mewbourne School of Petroleum and Geological Engineering

Prof. Jon E. Olson
Chairman and Frank W. Jessen Professor
Department of Petroleum and Geosystem Engineering
The University of Texas at Austin
CPE 2.502, Austin, TX 78712

July 5, 2017

Subject: Assessment of scholarly contributions of Dr. Z. Heidari

Dear Dr. Olson,

Per your request of June 15th, 2017, I have prepared a letter stating my assessment of Dr. Heidari's scholarly achievements. I know of Dr. Heidari from her publications only and have never met her. My assessment is based on her publications and what is documented in her curriculum vitae.

Since he joined the faculty at Texas A&M, she has been very active in publishing her research findings; 25 refereed papers and close to 60 refereed conference proceedings plus many more conference presentations. Most of her publications are in the broad area of petrophysics. Her contributions have been in the application of nuclear magnetic resonance technique, electrical and dielectric techniques in understanding properties of earth materials. Some of her laboratory experimental approaches are clever and novel. It remains to be seen how much her research impacts work of other researchers in this field. I find most of her publications well written and impactful.

She has been very active in SPWLA and SPE. She has graduated a large number of students both at MS and PhD level. Her research funding, mainly from the industry is strong. Dr. Heidari exhibits high level of energy and dedication to her profession. She has achieved a lot over a short period of time. She compares exceptionally well when compared to others in her position. It is very difficult to say how one will do in future but based on her record my impression is that she will continue to be very active and successful in her profession.

If you have any further questions please feel free to contact me at 405-325-6866 or by email at crail@ou.edu.

Sincerely,

A handwritten signature in black ink, appearing to read "Chandra S. Rai".

Chandra S. Rai
Director and Eberly Chair Professor

100 East Boyd Street, Sarkeys Energy Center, Suite 1210, Norman, Oklahoma 73019-1003

PHONE: (405) 325-2921

WEBSITE: mpge.ou.edu



Tuesday, September 5, 2017 at 9:56:10 AM Central Daylight Time

Subject: RE: Promotion Letter Request, Zoya Heidari
Date: Thursday, July 6, 2017 at 4:32:12 PM Central Daylight Time
From: Olson, Jon
To: Rai, Chandra S.
CC: Stickney, Stephanie

Chandra – Thanks so much for your help in this. I appreciate it. -Jon

Jon E. Olson
Chair and Professor, Petroleum and Geosystems Engineering
512-471-7375

From: Rai, Chandra S. [mailto:crai@ou.edu]
Sent: Thursday, July 06, 2017 4:31 PM
To: Olson, Jon
Cc: Stickney, Stephanie
Subject: RE: Promotion Letter Request, Zoya Heidari

Jon,

Attached is my assessment of Dr. Heidari's accomplishments and my short cv. Please let me know if you need any additional material.

Best,

Chandra

*Chandra S. Rai
Director & Eberly Chair
Mewbourne School of Petroleum & Geological Engineering
University of Oklahoma
Ph. 405-325-2921*

From: Olson, Jon [mailto:jolson@austin.utexas.edu]
Sent: Saturday, June 17, 2017 7:04 PM
To: Rai, Chandra S. <crai@ou.edu>
Cc: Olson, Jon <jolson@austin.utexas.edu>; Stickney, Stephanie <stickney@austin.utexas.edu>
Subject: Promotion Letter Request, Zoya Heidari

Dear Chandra - I have attached a letter requesting you to evaluate the promotion dossier of one of our assistant professors, Zoya Heidari. I have also attached her CV, 5 significant papers, and a brief research statement by Dr. Heidari.

As you know, the academic promotion process depends heavily on the role of outside, impartial evaluators. I hope we can count on you to help.

Please respond to this email as soon as is convenient as to whether you can do this evaluation. Assuming you are willing to participate, the deadline we are requesting for receiving your letter is July 7.

Thanks so much for your time and consideration.

Page 1 of 2

-Jon

Hook 'em!

Jon E. Olson, Chair and Frank W. Jessen Professor

Lois K. and Richard D. Folger Leadership Chair

The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-7375 | www.pge.utexas.edu

Chandra S. Rai, Ph.D.

Director and Eberly Chair Professor
 Mewbourne School of Petroleum and Geological Engineering
 University of Oklahoma

Educational Background:

Ph.D., Geology and Geophysics	University of Hawaii, Honolulu, Hawaii	December, 1977
M.S., Applied Geophysics	Indian School of Mines, Dhanbad, India	August, 1971
B.S., Applied Geophysics	Indian School of Mines, Dhanbad, India	August, 1970

Academic Service:

Original Appointment	November 1, 1999	Professor (Tenured)
Advancement	July 1, 2003	Mewbourne Chair Professor
	January 31, 2006	Director & Eberly Chair Professor

Additional Experience:

1978-1980 Post Doctoral Research Fellow, Hawaii Institute of Geophysics, University of Hawaii
 1980-1981 Assistant Geophysicist, Hawaii Institute of Geophysics, University of Hawaii
 1981-1999 Various technical and managerial assignments at Amoco Production Company Research Center, Tulsa

Consulting, Patents, etc.

Veritas Geophysical Services	British Petroleum	NexT
Anadarko Petroleum Company	ConocoPhillips	Statoil
Rock Properties Resources	Gupco	YFP Argentina
Devon	Cimerax	Apache
Pioneer		

Have been awarded 10 US patents.

Scientific and Professional Societies:

Society of Petroleum Engineers	American Geophysical Union
American Association of Petroleum Geologists	European Association of Geoscientist and Engineers
Society of Core Analyst	Society of Exploration Geophysicists

Refereed Publications:

Close to 150 in the area of rock physics, reservoir characterization, petrophysics and unconventional resources

Research Activities:

Have generated ~\$20 million in research funding since joining the University of Oklahoma. Currently managing two research consortium: Experimental Rock Physics (started in 2001) and Characterization of Unconventional Reservoirs (started in 2008).

From: <Olson>, Jon Olson
Date: Thursday, July 6, 2017 at 4:37 PM
To: "Robert L. Kleinberg"
Cc: Stickney
Subject: RE: Promotion Letter Request, Zoya Heidari

Robert – Thanks for your time and consideration. Maybe next time! -Jon

Jon E. Olson
Chair and Professor, Petroleum and Geosystems Engineering
512-471-7375

From: Robert L. Kleinberg [<mailto:kleinberg@slb.com>]
Sent: Tuesday, July 04, 2017 3:04 PM
To: Olson, Jon
Cc: Stickney, Stephanie
Subject: RE: Promotion Letter Request, Zoya Heidari

Dear Prof Olson,

Tenure promotion decisions are among the most important made by academic departments. Therefore I am honored to be asked to review the promotion to tenure of Prof. Zoya Heidari. With this honor comes the responsibility to write an accurate, insightful, and useful review. I hoped I could provide such a review to you, which is why my response has been delayed. But realistically, I am not able to do this. Although our fields of research significantly overlap, the I discontinued my petrophysics studies about the time Prof. Heidari started hers. Thus I am not up to date in Prof. Heidari's areas of expertise. Tellingly, I have never met her, or even heard her speak at a professional society conference.

I sincerely apologize for not having made this decision sooner.

Best regards,
Robert Kleinberg

Schlumberger-Doll Research
One Hampshire Street 617-768-2277
Cambridge MA 02139 kleinberg@slb.com

From: Olson, Jon [<mailto:jolson@austin.utexas.edu>]
Sent: Friday, June 23, 2017 12:44 AM
To: Robert L. Kleinberg <kleinberg@slb.com>
Cc: Stickney, Stephanie <stickney@austin.utexas.edu>
Subject: [Ext] RE: Promotion Letter Request, Zoya Heidari

Hi Robert – Here is Zoya's CV which was not included on the previous email. Thanks for you consideration of this request. –Jon

Hook 'em!

Jon E. Olson, Chair and Frank W. Jessen Professor
Lois K. and Richard D. Folger Leadership Chair
The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-7375
| www.pge.utexas.edu

From: Olson, Jon

Sent: Saturday, June 17, 2017 7:01 PM

To: kleinberg@slb.com

Cc: Olson, Jon <jolson@austin.utexas.edu>; Stickney, Stephanie <stickney@austin.utexas.edu>

Subject: Promotion Letter Request, Zoya Heidari

Dear Robert - I hadn't heard back from you yet, but I have taken the liberty to send you a formal request for a promotion review for one of our assistant professors, Zoya Heidari. I have also attached her CV, 5 significant papers, and a brief research statement by Dr. Heidari.

The academic promotion process depends heavily on the role of outside, impartial evaluators. I hope we can count on you to help.

Please respond to this email as soon as is convenient as to whether you can do this evaluation. Assuming you are willing to participate, the deadline we are requesting for receiving your letter is July 7.

Thanks so much for your time and consideration.

-Jon

Hook 'em!

Jon E. Olson, Chair and Frank W. Jessen Professor
Lois K. and Richard D. Folger Leadership Chair
The University of Texas at Austin | Petroleum and Geosystems Engineering | 512-471-7375
| www.pge.utexas.edu

From: <Olson>, Jon Olson
Date: Thursday, June 22, 2017 at 10:05 PM
To: "Reynolds, Albert"
Cc: Stickney
Subject: Re: Promotion Letter Request, Zoya Heidari

Hi Al - I'm sorry you are all booked, but I understand. Thanks for the quick reply.

- Jon

Jon E. Olson, Chairman and Professor
Petroleum & Geosystems Engineering
The University of Texas at Austin
Sent from my iPhone

On Jun 18, 2017, at 11:13 AM, Reynolds, Albert <reynolds@utulsa.edu> wrote:

Dear Jon,

I am really sorry but I cannot do the evaluation. I have an extremely full week and then leave on a three week vacation with my family.

Al Reynolds

From: Olson, Jon <jolson@austin.utexas.edu>
Sent: Saturday, June 17, 2017 10:46 PM
To: Reynolds, Albert
Cc: Olson, Jon; Stickney, Stephanie
Subject: Promotion Letter Request, Zoya Heidari

**I'm resending this message as some people reported trouble with the zip file. The 5 significant papers can be downloaded from this link:

https://www.dropbox.com/sh/scsqexs5wk2nzs5/AADhOcL4F_6G2CtpOJKvagia?dl=0

Dear Dr. Reynolds - I have attached a letter requesting you to evaluate the promotion dossier of one of our assistant professors, Zoya Heidari. I have also attached her CV, 5 significant papers, and a brief research statement by Dr. Heidari.

As you know, the academic promotion process depends heavily on the role of outside, impartial evaluators. I hope we can count on you to help.

Please respond to this email as soon as is convenient as to whether you can do this evaluation. Assuming you are willing to participate, the deadline we are requesting for receiving your letter is July 7.

Thanks so much for your time and consideration.

-Jon

Hook 'em!

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